Western Industry

February 1955

An 800 kva. flash welder turns out "chrome moly" parts for jet planes.
. . . see page 24

Automatic proportioning

Pictorial quality control

Flow-coating of aluminum

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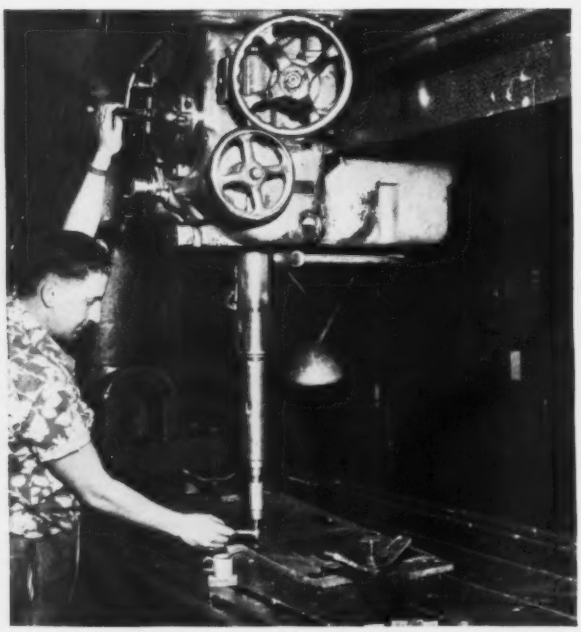
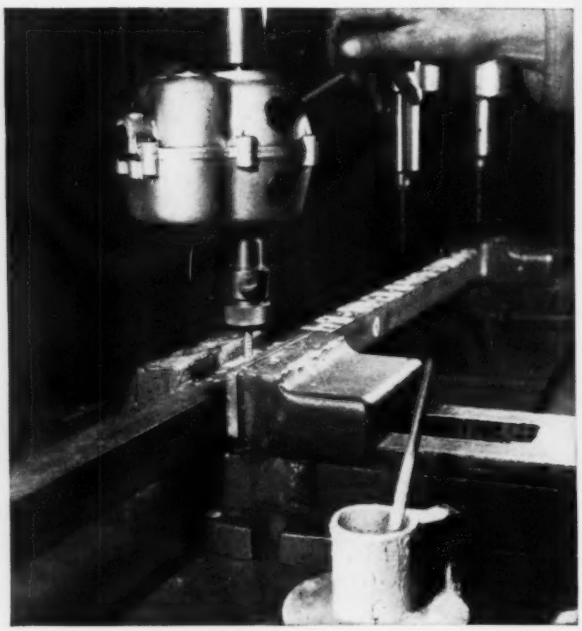
Standard Engineer's Report

CASE HISTORY
Calol TR Compound
LUBRICANT

Westinghouse Electric Corp., Sunnyvale, Calif.
FIRM

Westinghouse doubles tapping machines' output!





SINCE USING CALOL TR COMPOUND in place of the usual tap lubricants at the Westinghouse plant in Sunnyvale, California, operators have been able to run tapping machines, like those above, at twice the previous speed without rejects. In spite of the increased speeds, taps now last two to three times longer in work with all types of steel, including stainless. Sam Margolis, Group Leader, says that Calol TR (Tapping-Reaming) Compound not only lengthened tap life but doubled machine output.

REMARKS: This plant manufactures switch gears, transformers, and other electric and electronic equipment. In addition to iron and steel parts, special alloys such as silicon bronze are machined.

FREE CATALOG: "How to Save Money on Equipment Operation," will be sent on request to Standard Oil Company of California, 225 Bush St., San Francisco.

FOR EXPERT HELP on lubrication or fuel problems, call your Standard Fuel and Lubricant Engineer or Representative; or write to 225 Bush Street, San Francisco.

CALOL

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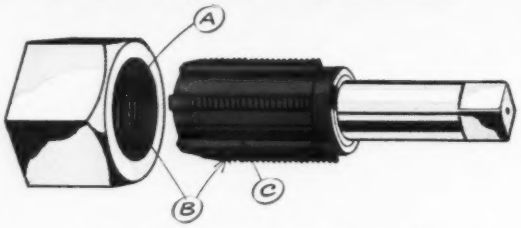
How CALOL TR Compound ups efficiency in severe metal-working conditions



A. Contains two unusually active extreme-pressure additives—prevents tearing, scuffing, galling of work, promotes good finish.

B. Withstands extreme temperatures—stops welding of tool and work, resists distortion, betters accuracy.

C. Provides good lubrication—allows faster machine speeds, increases production. Easily applied by brush or swab.

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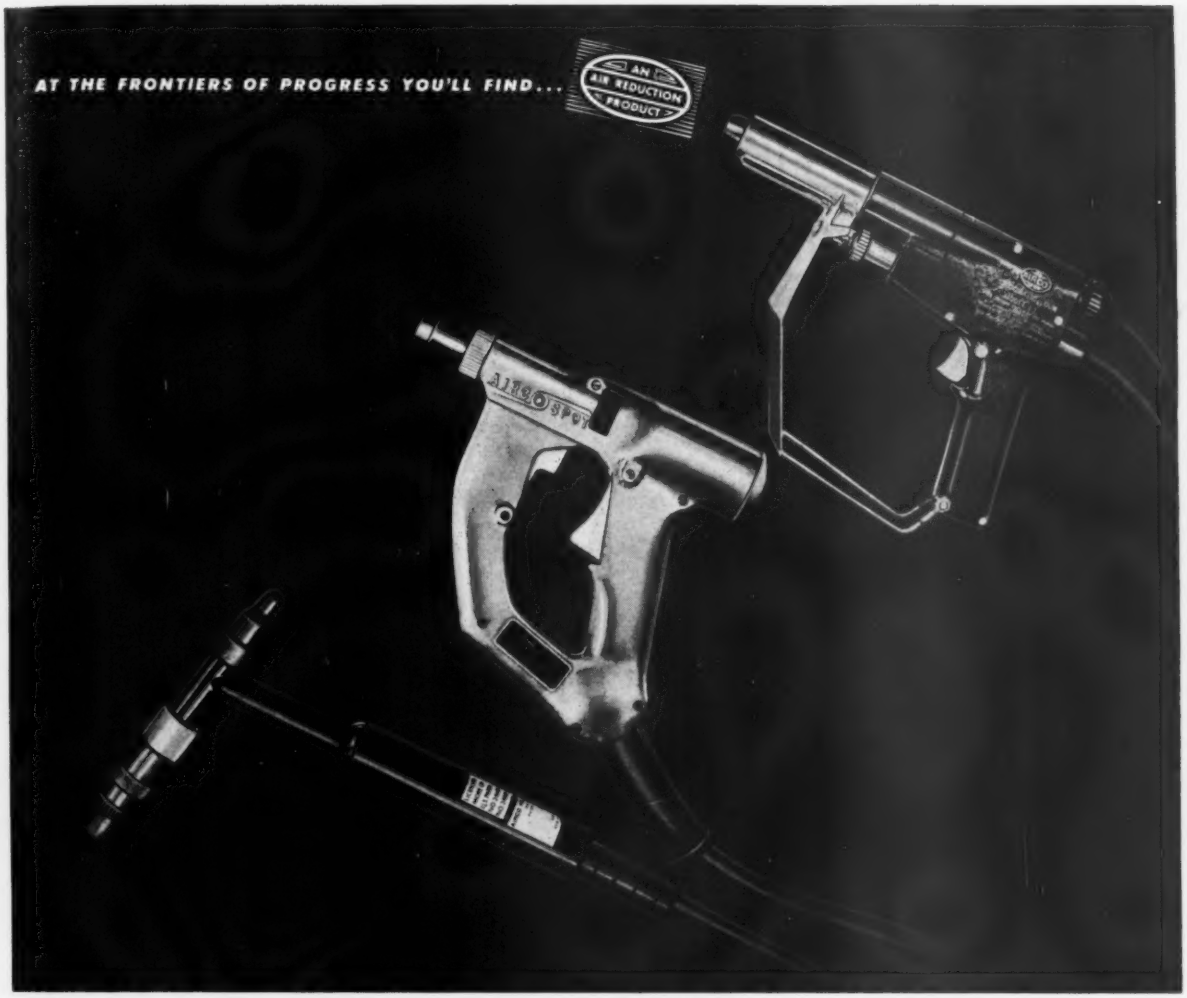

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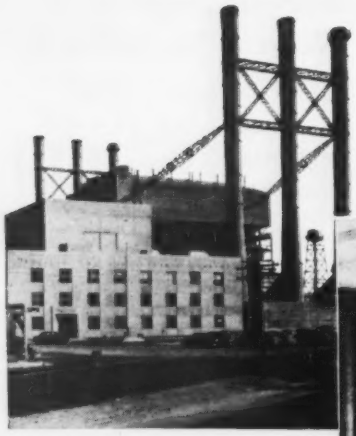
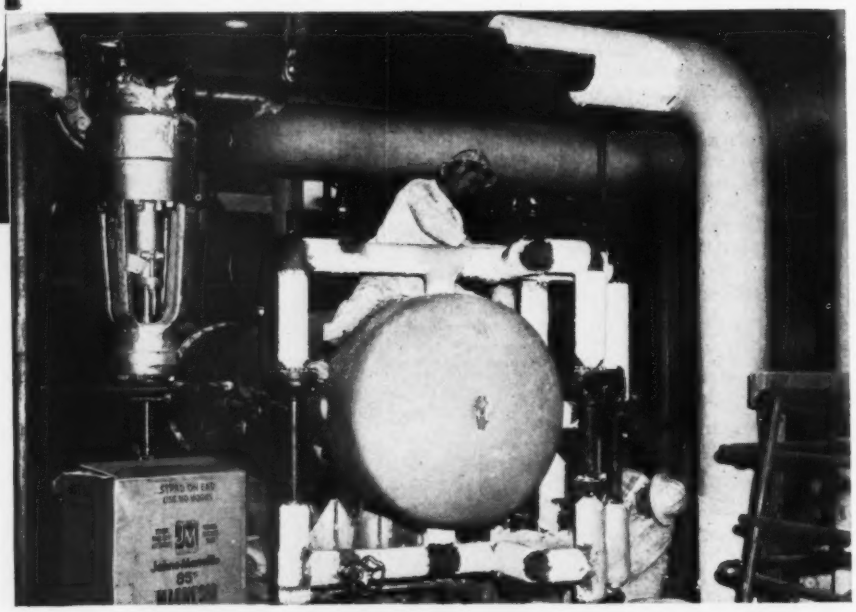


At the new Moss Landing generating plant



(Top) Moss Landing, California steam plant of the Pacific Gas and Electric Company, designed by Stone and Webster Engineering Corporation, under the supervision of the P. G. and E. Engineering Dept.

(Right) Skilled applicators of an outstanding J-M Insulation Contractor, Western Asbestos Company of San Francisco, applying J-M 85% Magnesia to pipelines during construction of the Moss Landing plant.

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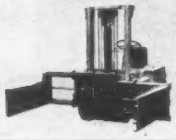

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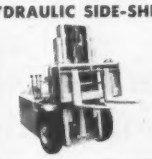

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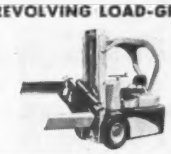

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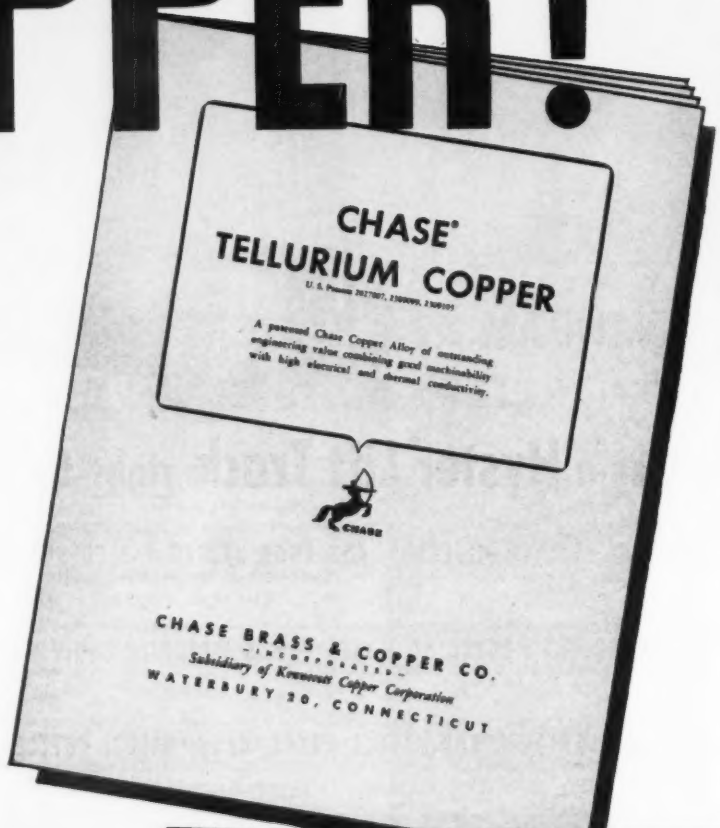
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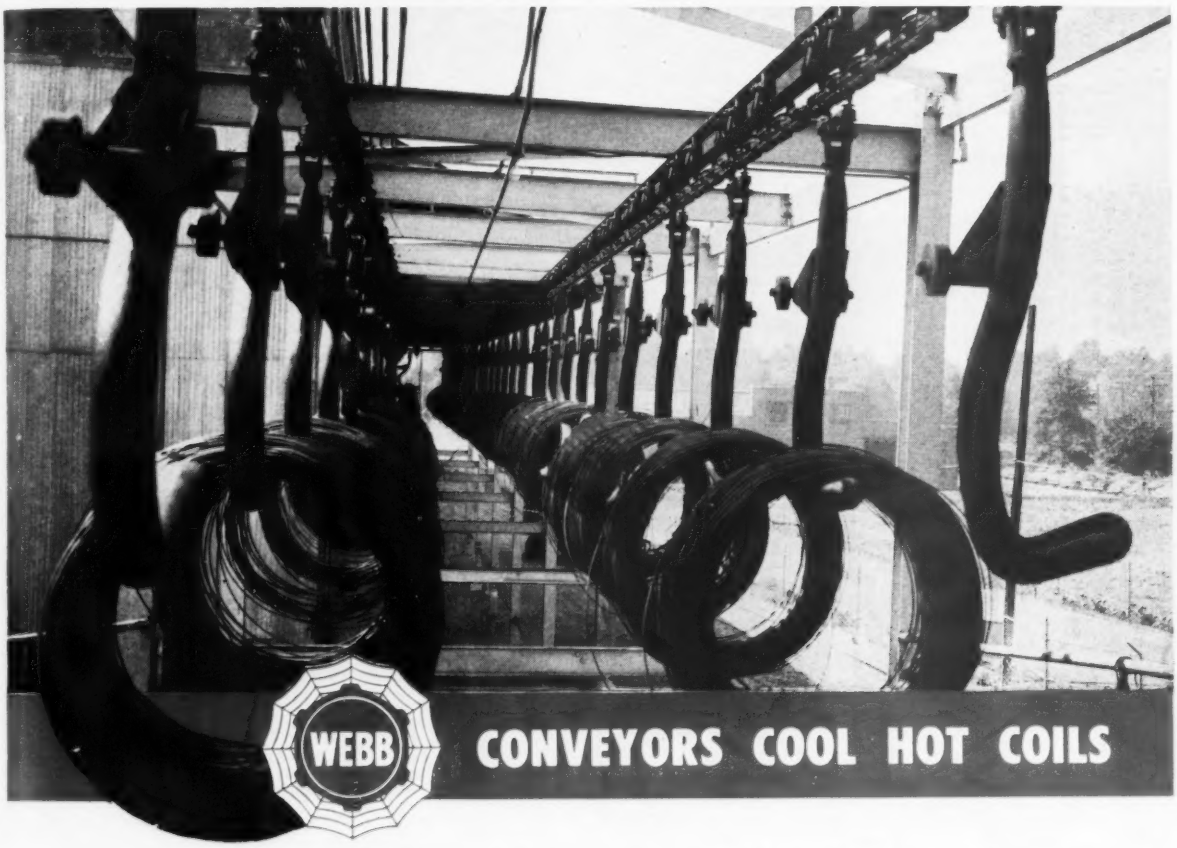

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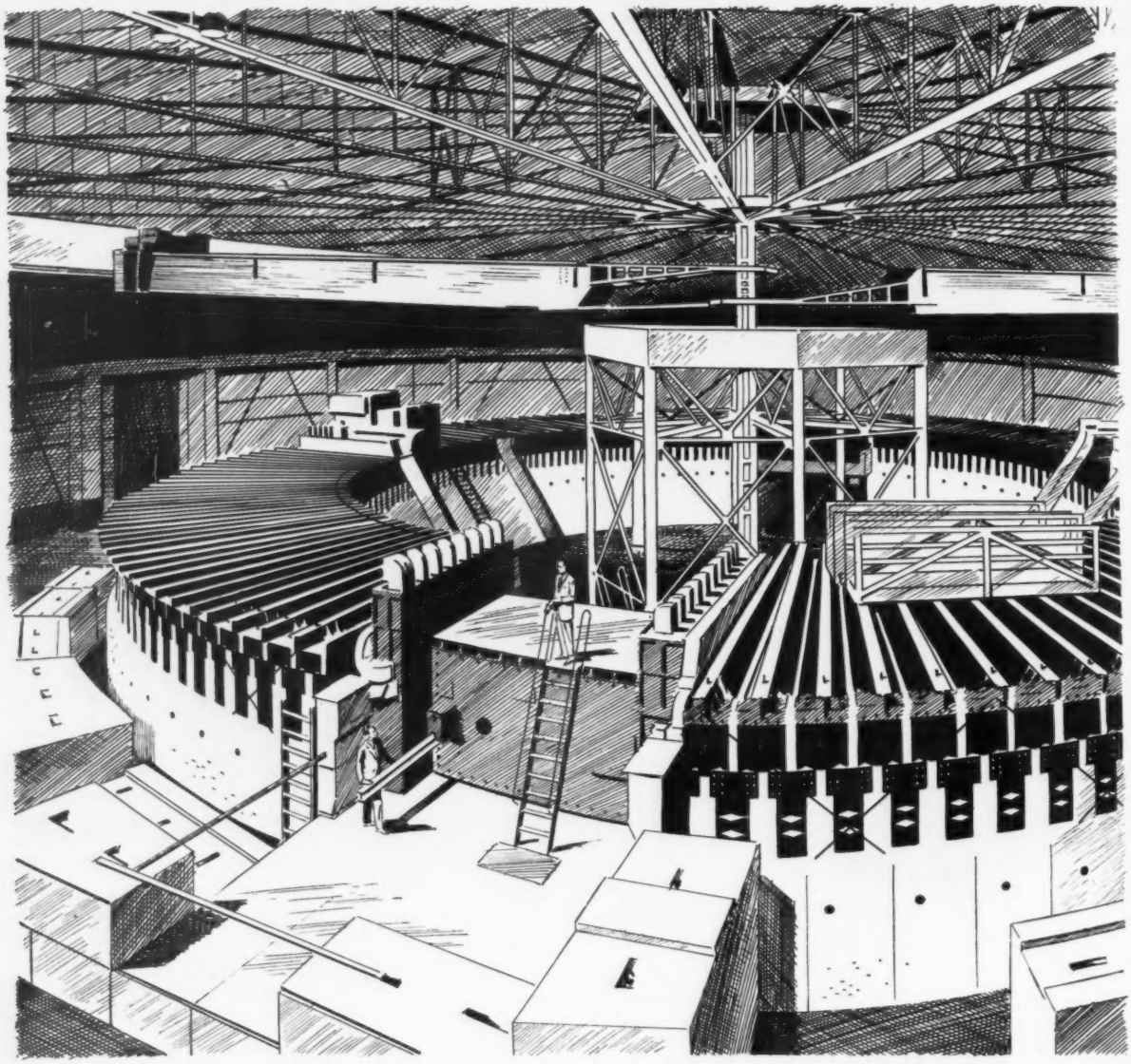

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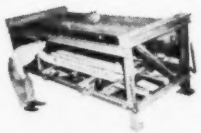
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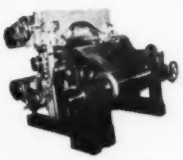
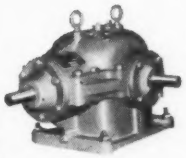

Special machinery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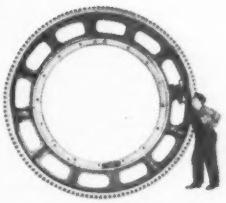
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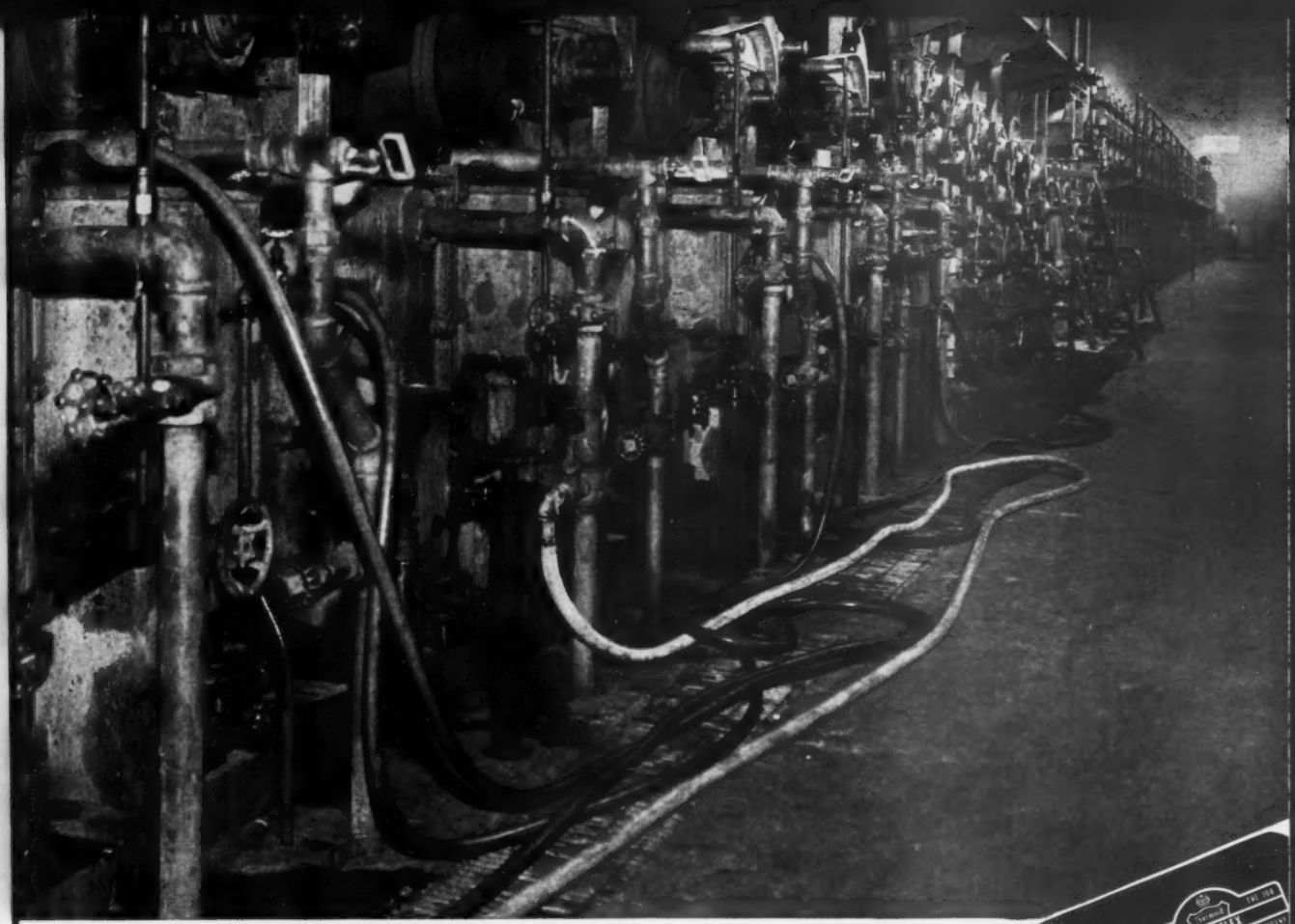

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In addition, Thermoid makes other types of hose for specific applications, such as paint spray, sand blast, dust collecting, etc. Call your Thermoid Distributor. He can help you select the hose best suited for your requirements. Or write direct for our latest catalogs.

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And naturally, *we* like it because every Magnetorque-equipped crane we sell makes more friends for P&H. Through 7 years and over 900 new installations we've had no failures. Service problems are fewer than ever. Magnetorque lasts the life of the crane.

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Western Industry

EDITORIALS

Too many coins in the fountain

PRESIDENT EISENHOWER'S Commission on Foreign Economic Policy faces a large dish of scrambled eggs when it comes to assessing the tariff situation in the West.

We have copper, lead, and zinc producers praying for relief from foreign competition, but we also have other producers of the same metals who own and operate foreign properties and are probably absent from the prayer meeting. We have tuna packers who fear Peruvian, Cuban, and Japanese competition, but we also have, so it is reported, other tuna packers who own South American and Caribbean canneries and are preserving a discreet silence.

We have Douglas fir mill owners blessed with a big export business, yet appalled by the encroachments of Canadian lumber on the Atlantic Coast market. We have coal operators who want more export tonnage to Japan and Korea, but object to natural gas being imported from Canada.

We have fruit canners, dried fruit packers, and fresh pear and apple shippers who would delight in seeing the United Kingdom's purchasing power restored to pre-Hitler and pre-Empire Preference days. And we have citrus shippers apprenhensive lest Spanish or Italian oranges land on the New York docks.

Yes, we also have a more recent hot potato in the bidding of foreign firms on generators for some of our Western hydro-electric dams.

It has been suggested to this Foreign Economic Policy Commission that tariff reductions should be handled by subsidizing the readjustment of domestic industries for a short period, rather than to subsidize these industries forever by tariffs. But are we cushioning a transition from butter to margarine, and eventually dispensing with the cushion, or are we subsidizing butter forever?

A year of shows

NO MATTER what industry an individual may be in, he can learn much by visiting any or all of the six big industrial shows to be held in the West in 1955. This is the largest number of events of this kind the West ever has had scheduled for a single year and provides Western industrial personnel more opportunities than ever before to inspect the latest in equipment right in their own backyard (even though that backyard is 1,500 miles square).

These exhibitions are good illustrations of the fact that Eastern shows, with their scanty attendance of Westerners, simply do not adequately serve the needs of industry in the West for access to good equipment displays. With more shows in the West, undoubtedly the Census Bureau's annual report on expenditures for new equipment will begin to present the West in a better light than it has appeared in the charts and statistics presented in the January 1954 and 1955 Western Outlook Numbers of WESTERN INDUSTRY.

"Let's go prospecting"

WHO HASN'T FELT the urge some time or other to throw some grub, blankets, pick-axe, shovel, and Geiger counter in a station wagon and start out early some Saturday morning (or late Friday afternoon, if you can sneak away that early). By Sunday night you may have a uranium mine like the fabulous Charlie Steen or Vernon Pick, or perhaps just an ordinary gold strike. Even if you find nothing at all, which is more than likely, you have a fine healthful outdoor weekend to show for it.

Finally someone has come out with a book ("Let's Go Prospecting" is the title) that tells you how to equip yourself for a prospecting trip, what kind of ore to look for, where you may possibly find it, and who will buy it if you discover anything. The author is Edward Arthur, whose other hat is mining commissioner of the Los Angeles Chamber of Commerce.

To our way of thinking, this book is likely to do surprising things for the mining industry by providing a lot of unpaid yet intelligent labor for exploratory work that the industry itself could not afford to finance.

Sounds like a good lesson also for other industries. Perhaps some of them could find ways to make use of the countless hours of free time that the five-day week has made available to our country.

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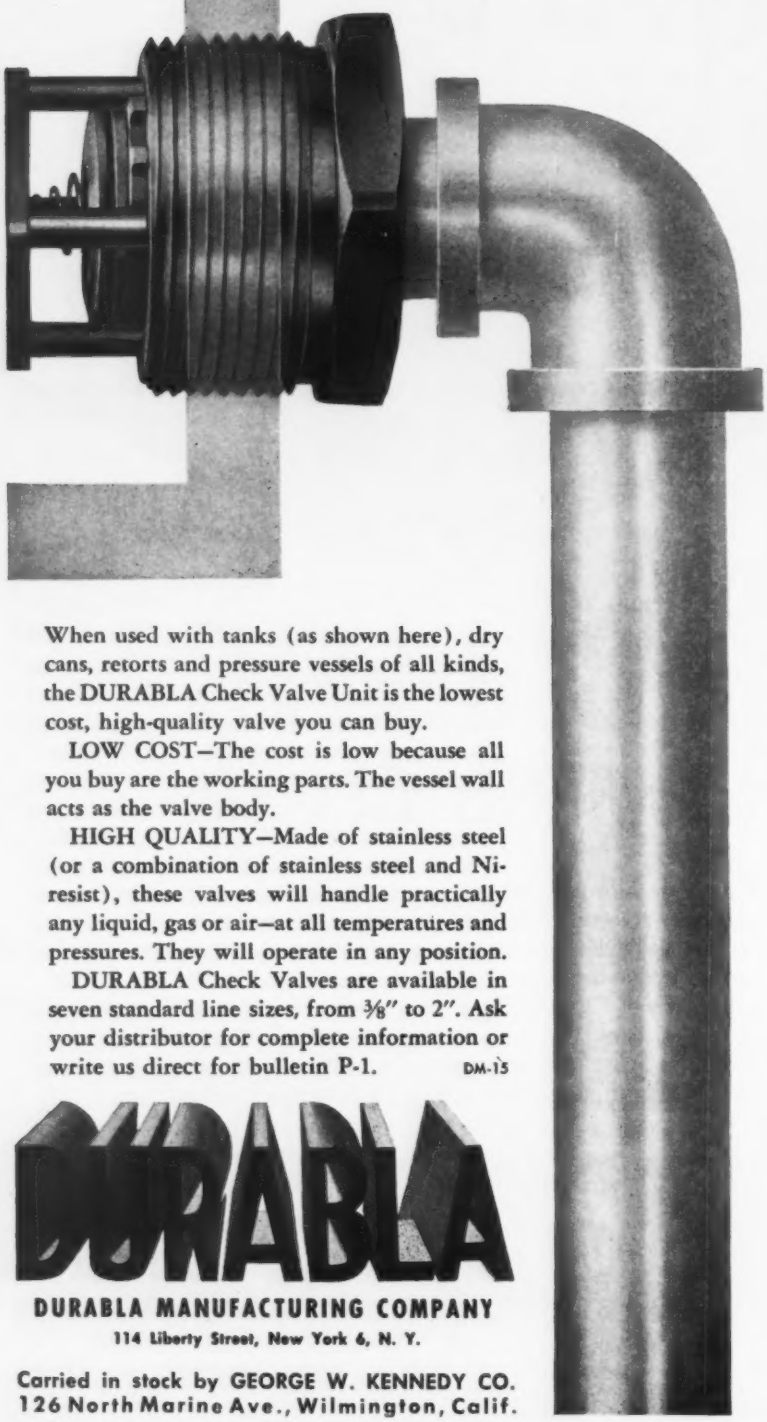

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LETTERS

Contributions to this column from our readers are welcome. Names will be withheld from publication if requested. Unsigned letters will be disregarded.

Defending free enterprise

Editor, WESTERN INDUSTRY:

It is of great importance to the free enterprise system that publications such as yours are discussing the problem which has been created by the government entering the field as an emergency establishment but ending up as a direct producer competing against privately financed, tax paying enterprises. It is natural that the government's role is most severely felt in the defense industry, for it is the only industry next to utilities which is operated on such a large scale that it needs government support to some degree.

It will take great vigilance on the part of every man believing in the free enterprise system to see that the support of the government will not result in the elimination of the privately financed small defense producer.

MRS. CHRISTINA WENTWORTH
Vice President
Longren Aircraft Co.
2576 West Carson St.
Torrance, Calif.

Editor, WESTERN INDUSTRY:

The Small Defense Industries Assoc. would like to thank you for a very fine editorial as published in the November issue of WESTERN INDUSTRY.

If possible, it would be appreciated if you could furnish us with a dozen tear sheets of this editorial.

W. P. BALDERSTON, JR.
Executive Secretary
Small Defense Industries Assoc.
P. O. Box 28
Glendale, Calif.

Efficiency kinks effective

Editor, WESTERN INDUSTRY:

I read your magazine with a great deal of interest and believe the "Efficiency Kinks" feature is a worth while addition.

In the November issue, page 81, you report on "Carbon Slides Replace Crane Trolley Wheels." The attached sheet on Graphitar current-collector wheels may be of interest to you in relation to this subject.

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Get in touch with your Signode Fieldman! He will be able to show you, too, how to make important savings in packaging, handling and shipping your products through the six basic unitizing methods. Quickest way to reach him is to write

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CALENDAR OF MEETINGS

MAR. 1-3—*Joint Western Computer Conference and Exhibit*, Statler Hotel, Los Angeles. Contact William Gunning, conference secretary, International Telemeter Corp., 2000 Stoner Ave., Los Angeles 25.

MAR. 2-5—*Western Pine Assn.*, regional meeting, San Francisco. Contact S. V. Fullaway, Jr., executive secretary, Yeon Bldg., Portland, Ore.

MAR. 7-24 — *Educational program, Puget Sound Chapter, American Society for Metals*, Guggenheim Hall, University of Washington, Seattle. Contact J. T. Toland, Joseph T. Ryerson & Son, Inc., Box 3268, Seattle 14.

MAR. 9-11—*National Assoc. of Engine and Boat Manufacturers*, Fairmont Hotel and St. Francis Yacht Club, San Francisco. Contact Thos. R. Rooney, Pacific Coast Representative, 369 Pine St., San Francisco.

MAR. 10-11—*Porcelain Enamel Institute*, Pacific Coast conference, Biltmore Hotel, Los Angeles. Contact Institute headquarters, DuPont Circle Bldg., Washington, D. C.

MAR. 14-18—*American Society of Tool Engineers*, industrial exposition and annual meeting, Shrine Auditorium and Shrine Exposition Hall, Los Angeles. Contact H. E. Conrad, executive secretary of ASTE, 10700 Puritan Ave., Detroit 38, Mich.

MAR. 14-25—*Natural Resources Conference*, regional, Davenport Hotel, Spokane. Contact Neal Fosseen, c/o Spokane Chamber of Commerce or telephone WA 6271.

MAR. 17-19—*American Society for Quality Control, 2nd Western Regional Quality Control Conference*, Benjamin Franklin Hotel, Seattle. Contact Dr. G. I. Butterbaugh, 210 Commerce Hall, University of Washington, Seattle.

MAR. 18-19—*Arizona Industrial Development Conference*, University of Arizona, Tucson. Contact Dr. L. W. Casaday, Director, Bureau of Business Research, University of Arizona.

MAR. 18-19—*Pacific Northwest Oil Heat Convention*, Hotel Olympic, Seattle. Contact R. G. Almslie, Oil Heat Institute of Washington, 905 Lloyd Bldg., Seattle.

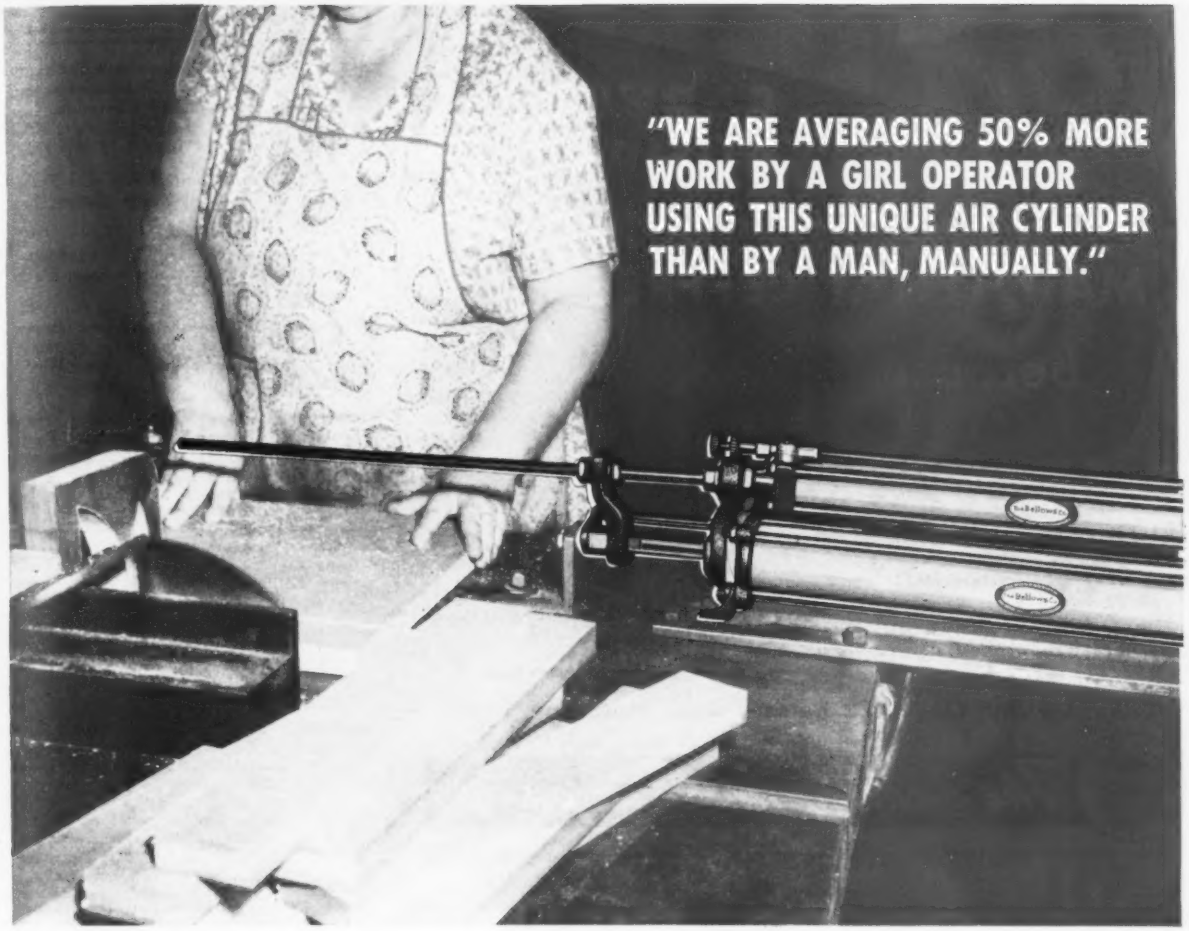
MAR. 25-26 — *American Foundrymen's Society*, Calif. regional meeting, Huntington Hotel, Pasadena. Contact Wm. C. Baud, Food Machinery and Chemical Corp., 4545 Pacific Blvd., Los Angeles.

MAR. 25-27—*Western International Assoc. Refrigeration Service Engineers Society*, Tacoma, Wash. Contact Tacoma Chamber of Commerce.

MAR. 28-30—*Intermountain Logging Conference*, Davenport Hotel, Spokane. Contact Charles Keim, Big Fork, Mont.

MAR. 28-APRIL 1—*Western Metal Congress and Western Metal Exposition*, Pan-Pacific Auditorium, Los Angeles. Contact W. H. Eisenman, American Society for Metals, 7301 Euclid Ave., Cleveland 3, Ohio.

. . . More on page 22



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CALENDAR

. . . Begins on page 20.

APR. 6-7—*Electrical Maintenance Engineers Assoc. of Southern California* conference, University of Southern California, Los Angeles. Contact Association office, 1052 West Sixth St., Los Angeles 17. MU 1734.

APR. 6-10—*World Plastics Fair and Trade Exposition*, National Guard Armory, Exposition Park, Los Angeles.

APR. 13-15—*Society of the Plastics Industry*, Pacific Coast Section conference, Palm Springs, Calif.

APR. 13-15—*Northwest Light and Power (Engineering and Operating Section)*, Davenport Hotel, Spokane. Contact Washington Water Power Co., Spokane.

APR. 18-20—*National Air Pollution Symposium*, Huntington-Sheraton Hotel, Pasadena, Calif. Contact Dr. A. M. Zarem, Stanford Research Institute, 621 S. Hope, Los Angeles.

APR. 19-20—*33d Pacific Coast Management Conference*, Claremont Hotel, Berkeley, Calif. Contact Everett Van Every, President, California Personnel Management Assoc., 2180 Milvia St., Berkeley 4. Calif.

APR. 19-20—*Northwest Wood Products Clinic*, Davenport Hotel, Spokane. Contact Everett Ellis, secretary, Box 291, University Station, Moscow, Ida.

APR. 20-22—*American Management Assoc.* orientation seminars, Hotel Ambassador, Los Angeles. Contact Seminar Registrar, AMA, 300 W. 43rd St., New York 36.

APR. 25-27—*American Management Assoc.* workshop seminars, Hotel Ambassador, Los Angeles. Contact Seminar Registrar, AMA, 300 W. 43rd St., New York 36.

APR. 28-30—*American Institute of Mining Metallurgical Engineers*, Pacific Regional conference, Davenport Hotel, Spokane. Contact Dr. F. R. Morral, c/o Spokane Chamber of Commerce, or telephone WA 1541, ext. 43.

MAY 8-10—*Pacific Northwest Trade Assoc.*, Vancouver, B. C.

MAY 11-13—*Pacific Coast Electrical Assoc.*, regional convention, Palace Hotel, San Francisco. Contact Victor Hartley, Executive Secretary, 50 West 16th St., Los Angeles 14.

MAY 26-27—*Electronic Components Conference*, Los Angeles. Contact Dr. Simon Ramo, Ramo-Woldridge Co., 8820 Bellance Ave., Los Angeles 45.

JUNE 6-10—*National Industrial Service Assoc.*, Statler Hotel, Los Angeles.

JUNE 15-17—*American Society of Training Directors*, annual convention, Ambassador Hotel, Los Angeles. Contact Ralph E. Wohlford, Publicity Committee, 2020 University Ave., Madison 5, Wisc.

JUNE 20-23—*Forest Products Research Society* national convention, Seattle.

JULY 12-14—*Second Western Plant Maintenance and Engineering Show and Conference*, Pan-Pacific Auditorium, Los Angeles. Contact Clapp & Poliak, Inc., 759 Monadnock Bldg., San Francisco.

AUG. 24-26—*Western Electronic Show and Convention*, Civic Auditorium and Fairmont Hotel, San Francisco. Contact Mal Mobley Jr., Business Manager, 344 North La Brea Ave., Los Angeles 36.

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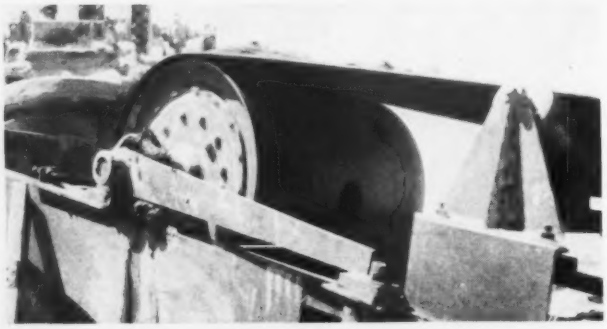

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THIS MONTH'S COVER

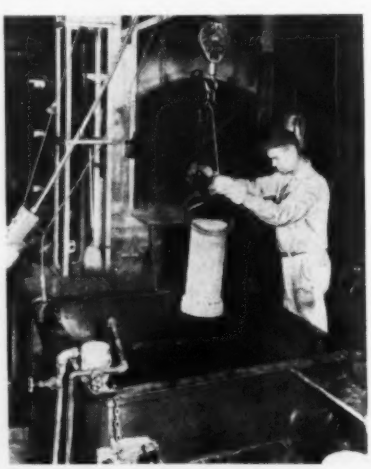
AIRCRAFT INDUSTRIES still growing, improving

AIRCRAFT, the West's mightiest industry, continues its quest for materials, processes, and equipment that will allow the building of lighter, stronger aircraft to travel at even higher speeds and greater temperatures.

From a careful analysis of the programs of major Western manufacturers, it appears that certain primary trends are becoming evident.

1. Continuing search and experimentation in the realm of high heat treat steels (260,000 to 280,000 psi.).
2. Use of chemical milling to inexpensively remove large volumes of unwanted metal.
3. Further development of titanium and titanium alloys for jet aircraft.
4. Experimentation on forming, welding, and machining of high temperature materials.
5. Use of printed and electronically etched circuit boards.
6. Increased use of compression forming of metal parts.

H. W. Loud Machine Works, Inc., Pomona, Calif., whose shop is shown on our cover this month, produces major sub-assemblies for aircraft manufacturers in its 200,000-sq. ft., 700-employee job machine shop. The 47-year-old firm is currently turning out jet engine cradles in large quantities.



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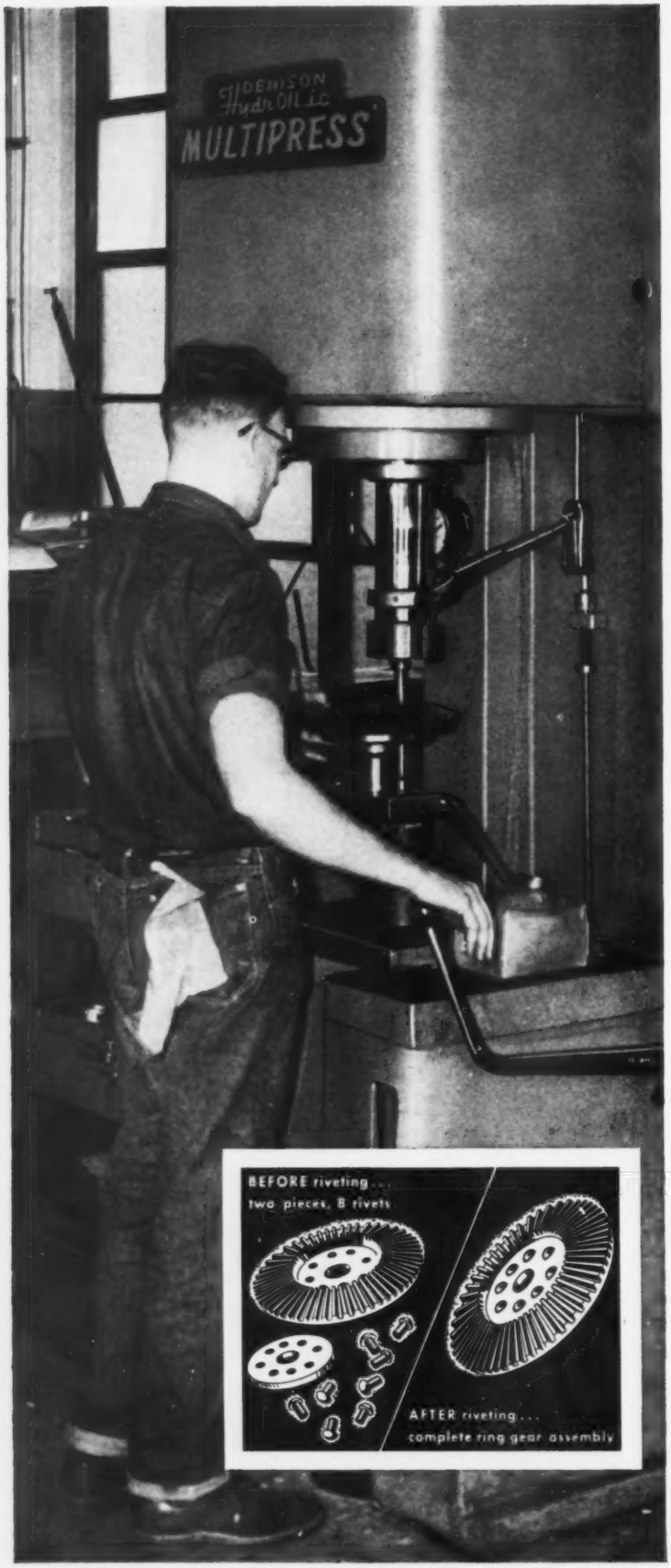

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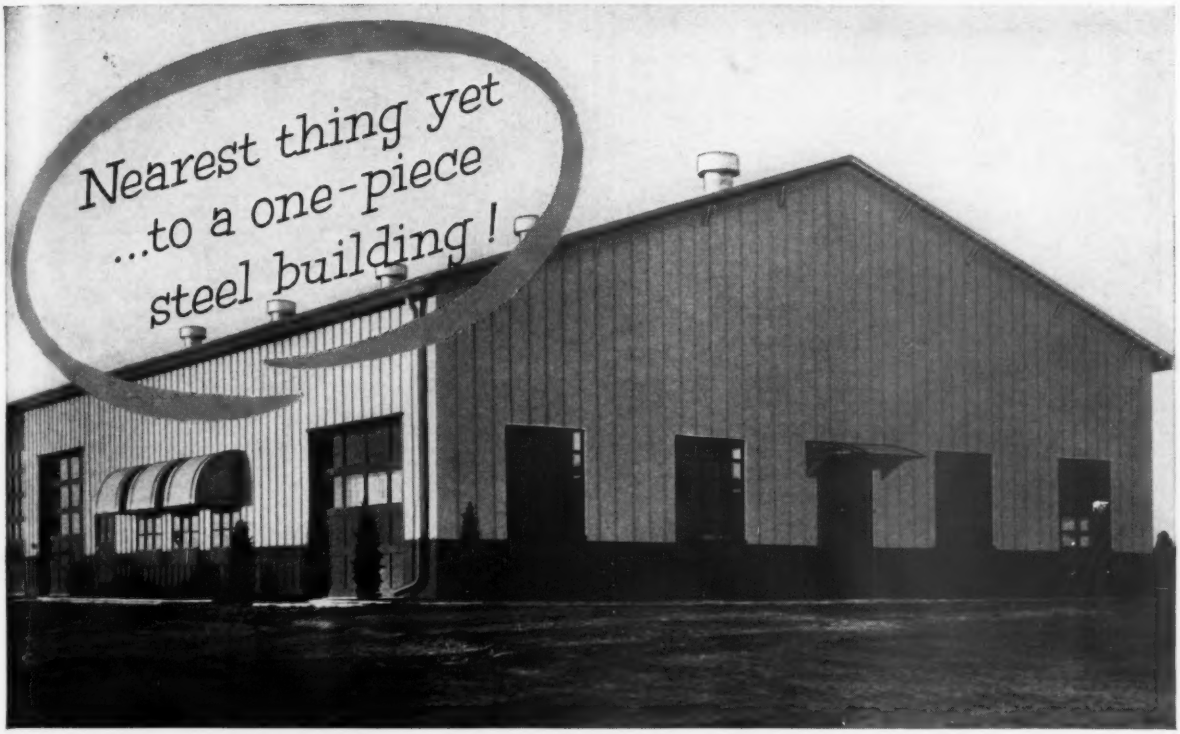

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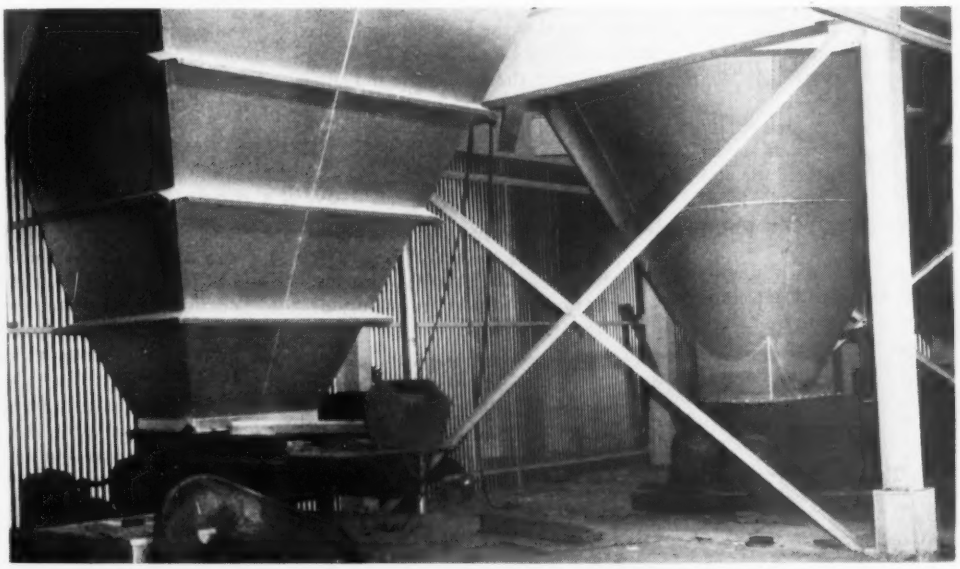


GATES and feeders, located on the charging floor, deliver sawdust and stucco from these bins to screw conveyor.

Automatic proportioning smooths production kinks

Electronic controls promote uniformity of product at Kaiser Gypsum, Seattle

By
PAUL E. ROSENTHAL
Mechanical Engineer
General Conveyor, Inc.
South San Francisco, Calif.

A SYSTEM of automatic continuous proportioning of gypsum mix for making wallboard has contributed to the solution of several operating problems, minimized surge loading at the wallboard machine, and —thanks to uniform quality—made the drying process more easily controlled.

This installation, including overall engineering, was made by General Conveyor, Inc., for Kaiser Engineers, Inc., at Kaiser Gypsum Co.'s new Seattle, Wash., plant.

A combination of electronically controlled continuous weighing feeders, plus a simple countershaft drive for a series of volumetric feeders, provides a system which can be controlled by the wallboard machine operator from a single pushbutton station.

Making wallboard is basically a continuous process where wet stucco mix resembling toothpaste is spread between two 4-ft. wide moving webs of paper (face paper and backing paper). The resulting sandwich is cut into predetermined lengths from 6 to 16 ft. Most wallboard production is in the familiar 4-ft. by 8-ft. sheet.

This same machinery can be set up for making lath and other gypsum board products; and various formula changes will yield lightweight, fire resistance, or other special properties. The amount of raw materials needed depends upon the formula, the thickness of the product, and the speed of the moving web.

The entire installation may be broken down into four elements:

1. Three Jeffrey Waytrol continuous-weighing feeders and their complete electronic control system, giving

precise weighed delivery of stucco, sawdust, and starch.

2. A group of seven volumetric feeders, including three Draver spiral feeders, a rotary vane feeder, and three Omega Rotodip liquid feeders, all chain driven from a Reeves Varidrive and common countershaft, and handling perlite, raw gypsum, wetting agents, and accelerators as required by the various products to be made.

3. A main gathering spiral conveyor which delivers the solid materials to the wallboard machine. This spiral conveyor is also driven by the countershaft.

4. A magneto which is driven by the screw conveyor and which serves as the connecting link between the mechanically controlled volumetric feeders and the electronic control panel for the Waytrols.

The opposite page shows a simplified flow diagram along with mechanical and electronic coupling devices that provide rigid quality control.

The three Waytrols are essentially belt conveyors constantly weighed by a scale system which in turn electrically controls the feed to the belt so that it is always in balance. With loading per foot of belt kept constant, the output of the feeder is proportional to belt speed. Belt speed variation is by means of Thymotrol motors.

Control system

Each Waytrol includes the control system for keeping itself in balance, an automatic alarm system, and a remote totalizer. The alarm sounds if the feeder runs out of balance or is starved for feed. If the malfunction is not cleared in fifteen seconds, the entire feeding system shuts down and an indicating light shows which feeder is in trouble.

Each feeder is controlled by a Leeds and Northrup PAT type recording controller which is so arranged as to make the belt speed a function of a certain control voltage. All three control circuits receive their control voltage from a common master voltage source. A switch at the main panel allows the operator to select either of two master voltage sources: one a fixed source from a stabilized rectifier within the control panel, the other the magneto mounted on the screw conveyor.

The master panel divides the master control voltage among its three "slaves" in a proportion that depends upon the settings of three voltage-dividing potentiometers. Each potentiometer is calibrated for outputs from 0 to 100% of full-scale.

When the master voltage source is unvarying, the three feeders will operate at constant rates. However, when the master control voltage fluctuates, as it may when the magneto is the source, the output of the three will change, while maintaining the desired proportions. Changes in magneto output voltage are a result only of magneto speed changes, which occur when the operator alters the speed of the screw conveyor and countershaft.

There are group-control knobs provided for both "fixed" and "tach" operation so that the feed from all three machines can be varied at once without resetting the proportioning dials. In any case, the master-slave relationship between the three feeders and the main control panel is the same; the group-control knobs may be thought of as calibrating devices.

The mechanically-driven feeders are all equipped with variable-speed drives so that the proportion of any constituent in the mix can be altered with minimum loss of time.

Future extension of the system to cause the raw materials feed to automatically follow the speed of the wallboard machine has been allowed for, as has the addition of up to three more Waytrols for gravimetric feeding of additional materials.

How it's made

Kaiser Gypsum's new Seattle plaster mill and board is the first complete gypsum products plant in the history of the Northwest.

The new installation has an annual capacity of approximately 100,000,000 sq. ft. of ⅜-in. gypsum board products and 35,000 tons of hardwall and special type plasters.

Raw materials are supplied from quarries on San Marcos Island, Mexico, by company-owned bulk ore carriers operated by a subsidiary, Gypsum Carrier, Inc.

The raw ore, crushed to 4-in. minus size at the quarry before loading on 10,000-ton ships, is delivered at Seattle from the vessels by boom conveyor into a shoreside hopper, from which it is transferred by conveyor belt to a covered stockpile building. This building is filled from the top, and it is tapped from below by concrete draw-down tunnel to conveyor belts which feed the rock to a Pennsylvania hammer mill for reduction to 1-in. minus pebble gypsum at the rate of 50 tons per hour.

From the crusher, the pebble gypsum is elevated to storage bins which feed two Raymond high side roller mills. The mills, equipped with air separators in closed circuit, grind the gypsum to a fine powder ready for calcining.

The calcining period is about 2¼ hours at a "cooking" temperature of 250 deg. and a "discharge" temperature of about 350 deg. At the end of this period, the batches are dumped into Ehrsam steel hot pits below the kettles and carried by screw conveyors and elevators to stucco bins, which have a capacity of 140 tons each.

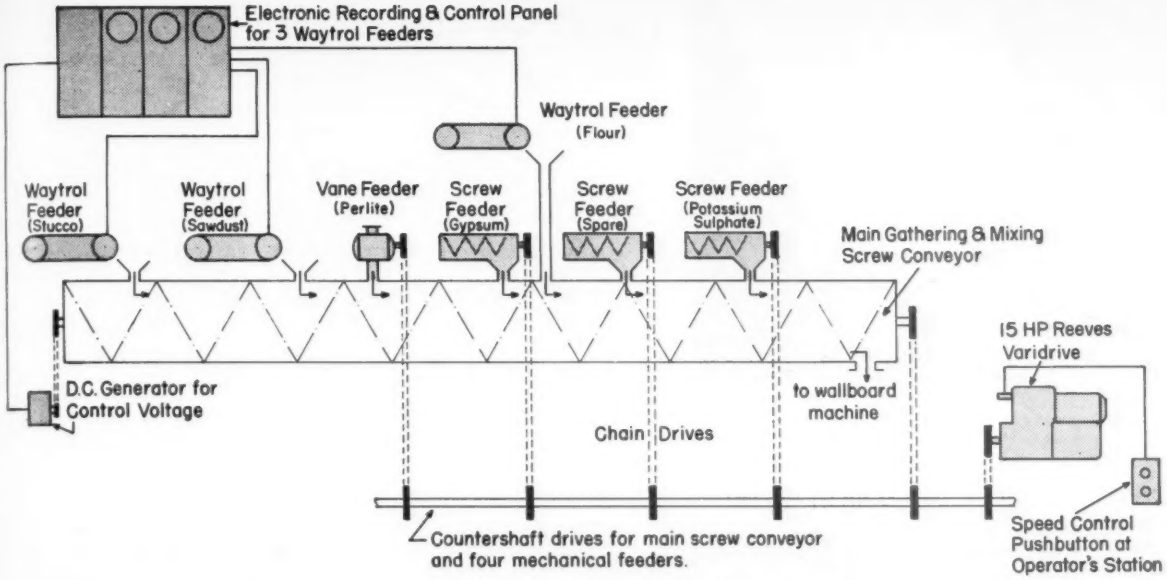
Stucco is taken directly from the hot pits below the calcining kettles and stored in two 100-ton cylindrical steel bins with conical bottoms.

Screw conveyors and feeders move the stucco, sawdust, and other additives into a mixing screw conveyor. The dry mix is then fed into a pin-type mixer at the head end of the board machine. Water is added in metered amounts and the resulting slurry is fed to the forming table.

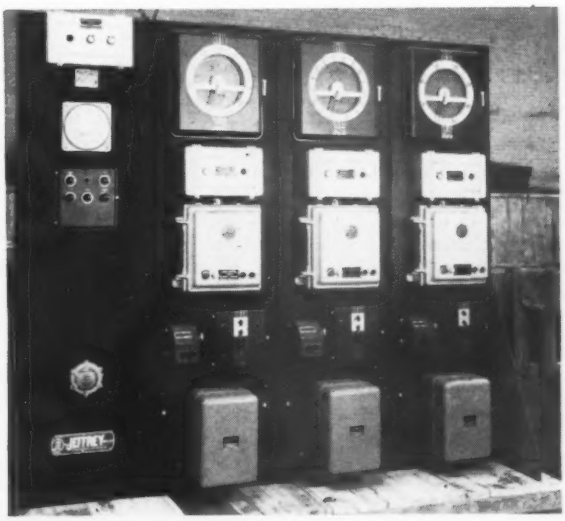
The supply rolls of special paper for backing and facing the lath or board unreel at the head end of the board machine, the slurry being deposited on the bottom layer of moving paper first, as the paper is drawn under the mixer. The top layer of paper is rolled on at the forming rolls and the overlapped edges are knurled and automatically sealed with an adhesive.

The board, now partially set, moves along on rollers. After cutting, the sections move at greatly accelerated speed to a transfer table and on to a Coe dryer, which parallels the board machine.

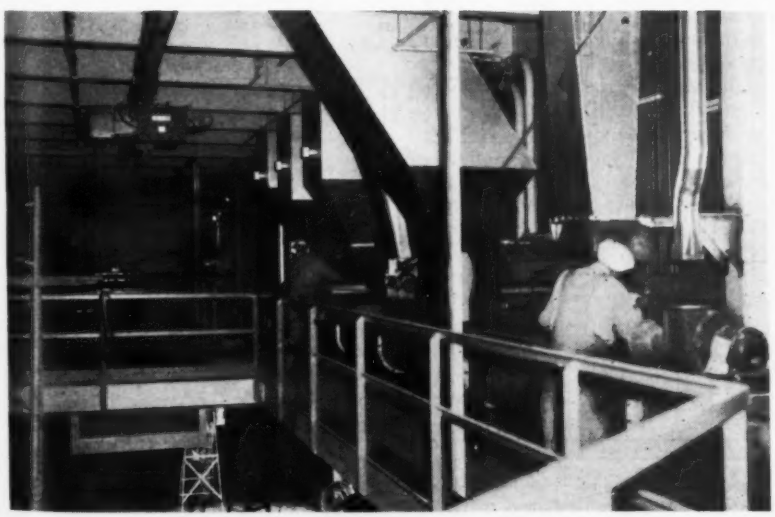
Board is dried by heat from steam coils in the enclosed section and air induced by a battery of fans. It requires approximately 80 minutes for the board to dry.


Electronic Recording & Control Panel for 3 Waytrol Feeders
Waytrol Feeder (Flour)
Waytrol Feeder (Stucco)
Waytrol Feeder (Sawdust)
Vane Feeder (Perlite)
Screw Feeder (Gypsum)
Screw Feeder (Spare)
Screw Feeder (Potassium Sulphate)
Main Gathering & Mixing Screw Conveyor
15 HP Reeves Varidrive
D.C. Generator for Control Voltage
to wallboard machine
Chain Drives
Countershaft drives for main screw conveyor and four mechanical feeders.
Speed Control Pushbutton at Operator's Station

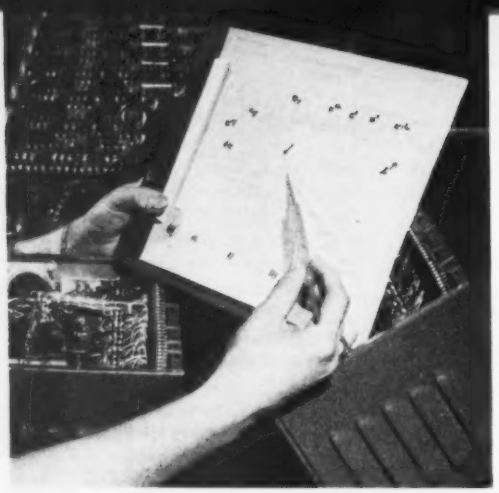
ABOVE: Diagram of the raw materials feed system at Kaiser Gypsum, Seattle. Note that four feeders are mechanically coupled while remaining three are electronically controlled. The two systems are finally integrated for overall control.



RIGHT: Proportioning control panel: master panel at left and three slave panels to the right. On master panel are (bottom to top): alarm horn, ratio-setter box, speed indicator, and main controls. Each slave panel includes (top to bottom): indicator-recorder, alarm relay box, automatic balance controls, totalizer and control amplifier, and belt thymotrol.



LEFT: Looking down the raw materials feeder system at bins pouring stucco, sawdust, perlite, gypsum, and potassium sulfate into the main gathering and mixing screw conveyor.



A PICTORIAL being used to check key points in electronic assemblies.

Both management and production workers can keep an eye on quality when a . . .

Picture system spots the defects

QUALITY of product is assured when the means of control is simple. Simplicity is the distinguishing mark of the LearCal quality control system called the Pictorial Inspection Record. It grew out of the necessity to develop a worksheet for electronic assembly inspectors which would accomplish the following objectives:

1. It must serve as a simple check list for the inspector.

2. It must indicate at a glance the number of defects, the nature of the defects, and their location.

3. It must become an easily maintained record or history sheet.

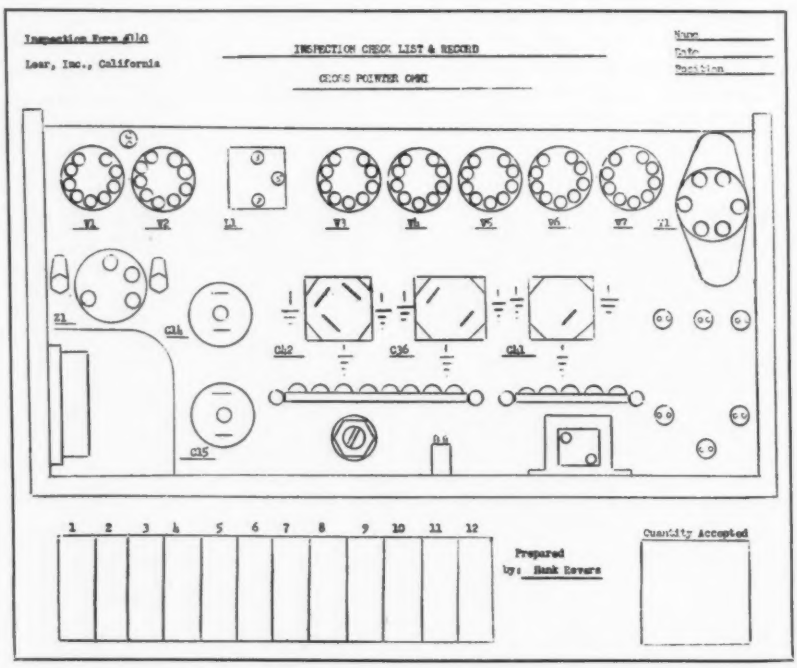
The pictorials are outlines of electronic assemblies clearly indicating the soldered connections and components to be inspected.

To simplify the inspector's job of describing defects, the twelve most common causes for rejection are coded 1 to 12, and 12 columns or boxes are provided on the pictorial record for recording them. An additional box is provided for recording the number of units inspected.

In daily use the inspector makes a check mark in the "number inspected" box as each unit is inspected, checks the appropriate box as discrepancies are found, and also makes check marks in red at the points on the outline where they occur.

Each pictorial is good for one assembly for one day. Thus, at the end of the day, or at any moment during the day, it will indicate:

1. Number of units inspected.
2. Number of discrepancies found.
3. Quality level in average defects per unit.
4. Which discrepancy occurred the most frequently (the 12 boxes constitute a frequency distribution).
5. Where the discrepancies occurred (indicated by the clustering of check marks at various points on the outline).



OUTLINES in the above pictorial clearly indicate the soldered connections and components to be inspected. Most common rejection causes are coded in 12 columns to simplify inspection.

By
FRANK SQUIRES
Quality Control Manager
LearCal Division
Lear, Incorporated
Santa Monica, Calif.

Most effective is the line of 12 boxes in which check marks for discrepancies accumulate. This easy-to-read frequency distribution is a constant stimulus to corrective action. It is a sensitive indication of the quality of workmanship, and production supervisors look to it for prompt indications of change.

Information which is being generated at every inspection station on the line is collected and consolidated into a summary for management. In the journey from line to front office it reaches into every part of the organization where a knowledge of product quality is required.

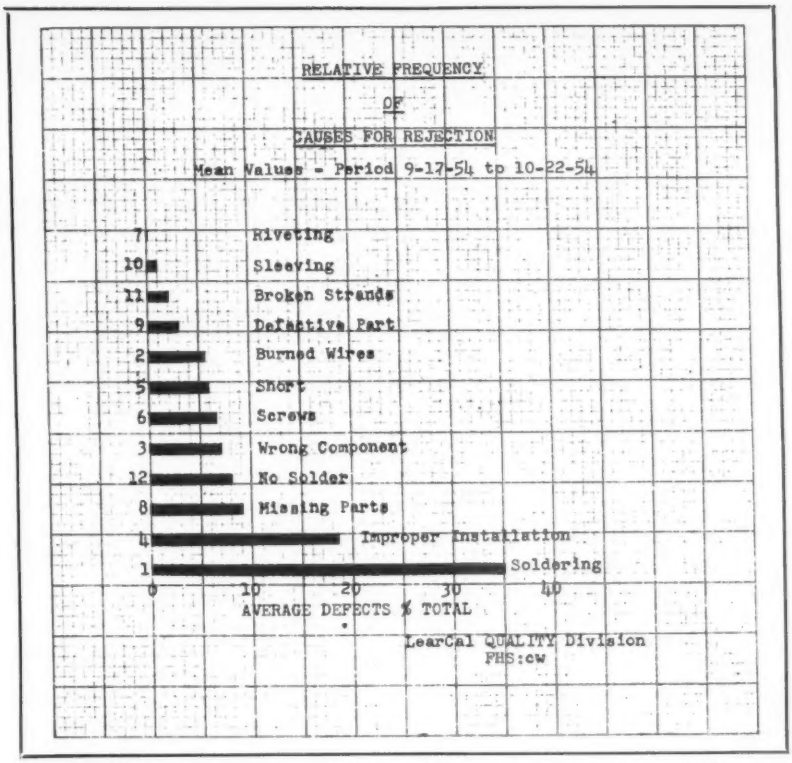
They make the rounds

Pictorials are seen by:

1. Production group leaders, who learn at a glance what defects are occurring most frequently and where.
2. Supervisor of assembly line inspectors, who keeps an eye on the pictorials throughout the day and combines all of them into one bundle at the end of the day. (He scans them for any unusual deviations and advises the production general supervisor that the situation is normal or that there is trouble on a particular product or in a particular area.)
3. Production general supervisor, who gets the combined bundle at the end of the day, together with the inspection supervisor's summary. (If there is trouble, the pictorials pinpoint the exact location.)
4. Quality control engineering office, where the pictorials are analyzed daily, the tabulation showing average defects per unit for all products and average defects per unit on particular products which are being watched.
5. Quality manager, who develops a weekly Quality Report from the analyzed pictorials and other inspection records.
6. General manager and all department heads, who receive the Quality Report.
7. Entire personnel of the assembly department to whom original data returns condensed to a point plotted on the quality curve.

Effective communication

The pictorial was meant to be no more than a useful inspection technique; it has become the nucleus of an effective communication system. Each check mark made by an inspector is, as it were, one drop in a stream of information which collects from every point along the assembly lines and flows to top management informing everyone in its course. The analyzed summary which returns and is posted as a point on the quality curve closes a circular path of communication.



THIS CHART shows a predominance of soldering defects over other causes for rejection. As a result of this information, a soldering school was set up for new operators and for all those whose work falls below minimum quality levels.

Communication can be conceived of as flowing round the circle at an irregular or spasmodic pace according to the varying quality of the work and the relative urgency of management's reaction. It follows a uniform rate of flow only when the quality is maintained at a high level.

A good deal of useful information has been obtained from the analysis of the pictorial inspection records. For example: the predominance of soldering defects over other causes for rejection was demonstrated most emphatically by the bar chart shown in the illustration. As a result, a soldering school was set up for new operators and for all those whose work fell below the minimum quality levels.

Inspectors and producers meet in conference periodically to discuss the progress of quality revealed by the pictorial summaries. Comparisons are made and competition between groups is stimulated.

Our objective was to build quality into the product. The pictorial helps accomplish this by making quality information readily available to all levels of the organization. Results have been highly satisfactory.

What they do

The LearCal Division of Lear, Incorporated, located in Santa Monica, Calif., does a considerable amount of research and development for the military on automatic flight controls and servomechanisms.

It also devotes its facilities and engineering resources to the design and quantity production of a complete line of aircraft radio communications and navigation equipment for commercial use. These include the L-2 autopilot, VHF and LF communications systems, omnirange navigation devices, automatic direction finders, and a very complete range of aircraft radio accessories.

Paint spray methods yield closer tolerance coatings

PARTS DESTINED for flow-coating are stamped with an Air Force catalog number that is still visible through the dried primer coat.

. . . NEXT, parts are hung on the flow-coat conveyor. One of the conveyor loading stations is shown below.

A NEW method, called flow-coating, has been adopted by Northrop Aircraft, Inc., Hawthorne, Calif., to prime aluminum and aluminum alloys with a corrosion-inhibiting coating. This is reportedly the first successful application of low viscosity zinc chromate to aluminum using continous automatic spray techniques.

Flow-coating at Northrop has doubled the output of a standard water-wash booth (compared to dip or hand spray methods), cut labor costs, lessened the danger of heavy gallonage losses through contamination, and probably most important, provided industry with closer-tolerance dried film coatings through adaptation of automatic paint-spray methods.

This method also greatly reduces handling, primes with a single pass as compared to the two passes sometimes necessary using dip or hand-spray systems, and assures greater control over the final dried film thickness.

Upwards of 600 parts an hour run through a flow-coating booth installed with twelve fixed, but pattern adjustable garden-type spray nozzles. From priming, parts are conveyed 100 ft. (the drip run) to a forced hot-air and infrared dryer, after which they are ready for packaging.

Flow-coating — continuous, automatic paint spraying—has heretofore been used principally to apply average to heavy viscosity finishes—enamels, for example. Now the method is being adapted to very light viscosity finishes. Zinc chromate primer has a viscosity between 3.5-5 Poise Absolute at 25 deg. C. (22-27 seconds on Zahn G5 cup).

Primer thinned down

Northrop's primer is thinned still further: 2½ parts reducer to 1 part packaged primer. In flow-coating, primer thickness (the dried film thickness) is largely controlled by viscosity of the cut primer.

Interior-aircraft components get just one coating of the zinc chromate primer, Northrop Seal No. 75, thinned with Sherwin Williams Flo-Coat primer reducer, a corrosion-inhibitor for aluminum and aluminum alloys. The same primer works satisfactorily on other types of light metals (titanium and magnesium), either alone or with a top coat. Applied to other than aluminum, the primer's function is that of insulating rather than corrosion inhibiting.

Close tolerances are called for in the dried, finished film. Thickness of a single dried primer coat is held to between 0.25 and 0.35 mil (0.00025-0.00035 in.). Total thickness of zinc chromate primer on surfaces to be topcoated must not, according to both Northrop and Air Force specs, exceed 0.7 mil (0.0007 in.). Reason: danger

. . . Here's a new way to apply a corrosion-inhibiting film to aluminum

of embrittlement and cracking in the overlying coat. Also to be avoided are dried film thicknesses less than .25 mil, because primer films of such thinness are not effective corrosion-inhibitors.

There are a number of application criticals: (1) nozzle pressure; (2) ratio of thinner to primer; (3) pattern and fineness of the spray.

These, in turn, determine: (1) the thickness of wet coating, thus dry film thickness; (2) amount of thinner lost up the flow-coating booth's exhaust stack; (3) amount of primer and thinner added during any production run.

Film thickness

Most critical is wet film thickness. Because flow-coating is automatic—a kind of "stall shower" spray method—once critical tolerances have been established, film control is assured.

Of all criticals, nozzle pressure is probably second in importance. Not only is actual spray pressure critical, but also the spray pattern. This latter is regulated by the type of spray-head installed, and by the head's positioning in relation to parts moving down the line. Nozzle pressure is determined by: (1) pump pressure; (2) diameter of spray-head orifices; (3) viscosity of the mixed, dilute primer.

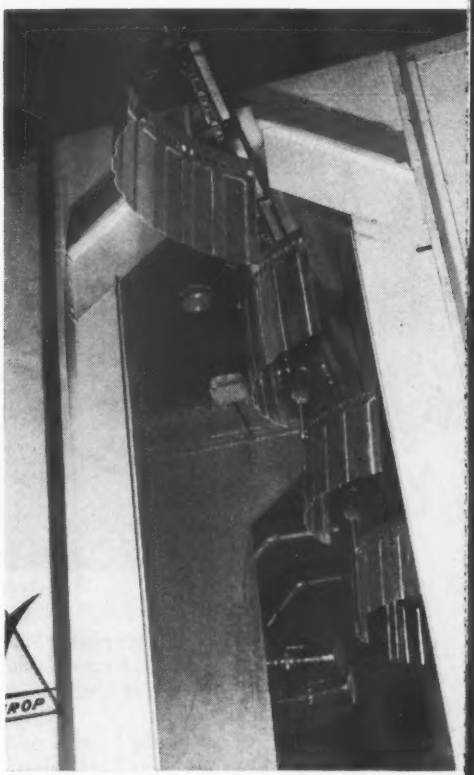
"Pressure," says Northrop's K. B. Niles, the process engineer who developed the Northrop-formula zinc chromate, "is exceedingly critical. Raise the pressure 1 to 2 psi. and you lose two to three times as much solvent (thinner) up the stack. This is because of the thinner's high boiling point."

Greatest operational variable, of course, is the dilute primer—since thinner loss is relatively high over even short runs.

Northrop assigns an operator to its spray booth to check solution dilution and add thinner and primer as required. Viscosity is spot-checked every 15 minutes, gaged by weight per gallon of operating tank solution. Samples are taken from the operating tank in a 77 ml. cup.

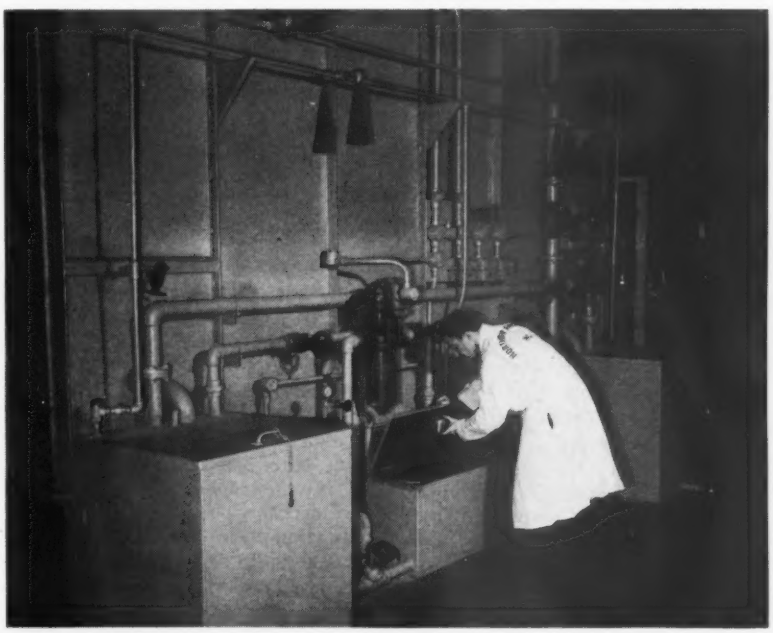
The cup, its contents, and lid, are weighed on a torsion balance scale. By consulting a graph, charting the reduction ratio by liquid weight, the operator obtains a figure which in turn is multiplied by the operating tank's liquid level. This level is found by measuring tank contents in inches.

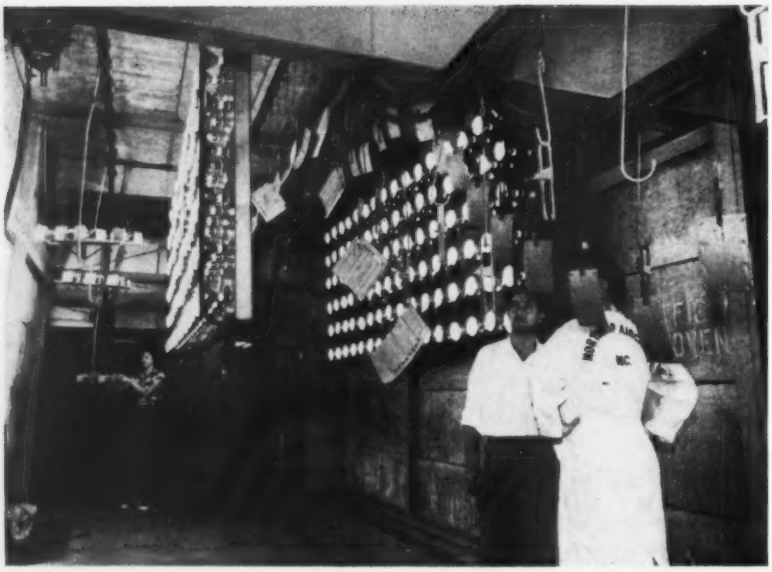
Usually, 1½-2 gal. of thinner are added to the operating tank every 15 minutes. Average hourly usage: 6-7 gallons of thinner. By comparison,



PARTS ride the conveyor line into the flow-coating booth for a coat of zinc chromate. Film thickness is most critical factor in this spray coat method.

BOOTH operator checks critical solut'on dilution with a 77 ml. cup and then adds thinner and primer as required. Checks are made every 15 minutes.





AFTER coating, parts ride along a drip run to the drying booth. The 21-ft. infrared dryer consists of ninety-two 250-watt lamps in two banks. Temperature is 150 deg. F.

JAMES D. BRENEMAN (right), head of paint and process department, and E. E. Honea, assistant foreman, examine parts coming off the flow-coating line.

only a few gallons of primer are added during an 8-hour production-painting run. Primer is much more expensive than thinner.

Loss of primer up the booth's stack is low, although loss of thinner through exhaust and evaporation is high.

It is also true that low viscosity zinc chromate dries more rapidly than higher viscosity enamels. Thus, the flow-coating line has but a short "drip run" between spray-booth and drying booth.

Four stations

The line consists of four stations, served by a 320-ft. endless overhead trolley. First comes a loading station, approx. 35 ft. from the flow-coater. Next in line is the 23-ft. long Flo-Coater. A hundred feet of conveyor runs from Flo-Coater to dryer. This "drip run" gives sprayed parts a chance to drip excess primer, leaving a uniform coating.

Next comes a 21-ft. long forced hot-air and infrared dryer which handles three lines in all, including the Flo-Coater's. A hundred and ninety-two 250-watt infrared lamps in two banks keep temperature to 150 deg. Out of the dryer, primed parts move to an unloading-packaging table, completing the finishing cycle.

The flow-coating line is installed with a Jervis Webb continuous belt, variable between 3 and 12 ft. per minute. Some parts are suspended from Yates clamps, spaced 12 in. on centers. Clamps leave no bare spots—just three tiny pin holes which seldom need retouching. Small stamped parts are often hung from "Christmas tree" fixtures. This type fixture is highly practical in flow-coating. Because each Christmas tree holds as many as 8 parts per fixture, some priming runs see 1,000 parts flow-coated per hour.

Christmas tree fixtures weren't practical using dip-tanks and hand spraying. Under that arrangement, each part had to be weighted to sink into the dip solution, and even though weighted, parts were often lost in the tank. Not so, however, when processing between automatic spray nozzles.

For pressure and pattern control, nozzles supply primer from the operating tank via a 3-in. Viking Model LL-152 paint pump, capacity 100 gpm. at 10-15 psi. Pump is driven by a 5-hp. explosion-proof motor. Another motor-driven pump circulates primer from its storage tank to the operating (or mixing) tank. This pump is a 1½-in. Viking Model ZK, capacity 20 gpm, at 10-15 psi.

Two banks of nozzles

Interiorly, the Flo-Coater (by Erikson Manufacturing Co., El Monte, Calif.) is rigged with two banks of six spray nozzles each, one on either side of the booth. A typical bank contains 6 nozzles in three vertical rows, each 12 in. on center. Horizontally, nozzles are installed 24 in. apart.

For flow-coating with low viscosity zinc chromate, Northrop removed Flo-Coater nozzles, substituted standard garden-type spray heads. Individual rows of nozzles may be valved off.

No alterations were made in the garden-type nozzles, each giving approximately 60-deg. spray pattern from about 100 No. 65 holes. Orifices were not redrilled, enlarged, or altered.

Nozzles, operating between 1½-2 psi., are fed from an exterior system of storage tanks, regulators, filters, and pumps. There is a primer storage tank with a capacity of 140 gal. and a thinner tank of similar capacity. There is also an operating tank (123 gal.) although only 45 gal. of thinned primer circulate the booth at any one time.

Certified zinc castings offered

by voluntary quality control plan

MANUFACTURERS using zinc castings in their business can now rest assured that the die castings they receive are of metal purity conforming to ASTM specifications — provided these bear the seal of the Certified Zinc Alloy Plan.

This plan, sponsored by the American Die Casting Institute, employs an independent laboratory to test sample production-run die castings from member plants. A number of Western manufacturers have joined this voluntary quality control system—five new members signing up in the last few months.

Users of die castings have begun to recognize the advantage of buying certified castings too.

A typical West Coast manufacturer using certified zinc die castings is Allegretti & Co., North Hollywood, Calif., producing lawn edgers. This firm specifies certified zinc die castings for the housing and gears of its Rota-Shear models. Over a million of the units have been produced without a gear failure.

In South Pasadena, Calif., the Helipot Corp., a division of Beckman Instruments, Inc., produces finely-calibrated, close tolerance counting dials for setting multi-turn components. Formerly produced by screw machine techniques, these critical components were redesigned as die castings because of the substantial cost reductions inherent in the process.

Procedure

When ADCI members producing zinc die casting are licensed to participate in the plan, they must designate one employee in the plant as the official plant sampler. He is instructed to select at random production-run die casting samples from zinc machines operating on dates specified by ADCI headquarters. Each sample chosen must weigh at least six ounces and samples must be selected from at least two different zinc die casting machines.

These sample die castings are mailed in special mailing bags on the day of sampling, and postmarks are checked as evidence of compliance.

The ADCI testing laboratory, a recognized, independent testing organization, makes its metallurgical analyses by spectrographic analysis. If the test results show the samples to be "on grade," test results are forwarded simultaneously to the die caster and ADCI.

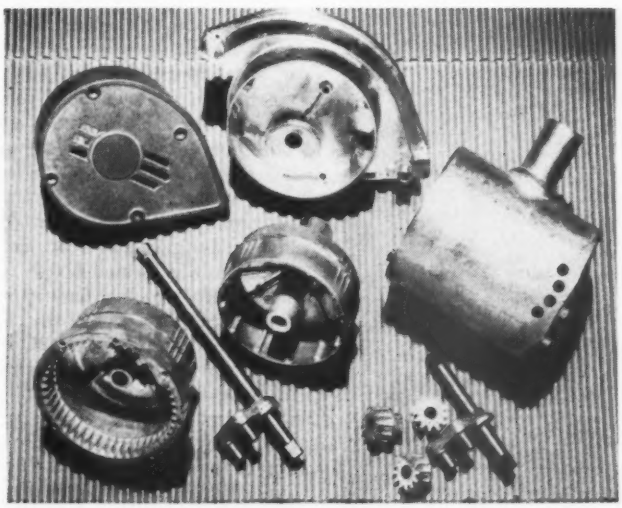
If the casting is "off grade," the test report is sent to the Institute, with simultaneous telegraphic notification to the die caster. The Institute follows up by suspending the CZAP license and privileges. From sample date to final report, the procedure takes a maximum of 48 hours. This means that off-grade castings can be recalled before assembly in the customer's product, if it is too late to prevent shipment.

When a die caster is informed of an off-grade casting, he is given a limited period of time to correct the condition and eliminate the cause. When satisfactory corrective measures are taken and proven by re-test, the license is restored. Cases of license suspension or revocation are extremely rare, because the plan is voluntary and participants would not join unless they were in practice maintaining the standards.

As a double check on the sampling procedure outlined, the laboratory maintains field investigators who make unannounced visits at least twice a year to each member plant. By CZAP regulation, he must be admitted to the casting department within thirty minutes of his arrival, or the die caster's license is automatically suspended. The field representative selects samples from every zinc die casting machine in operation and personally sends these to the laboratory for testing.

Through this continuous testing program, quality of zinc die castings is assured to consumers. Many consuming companies have learned that they can rely on a certified zinc die casting—one that carries the seal.

CERTIFIED zinc die cast components of the Rota-Shear Lawn edger show smooth appearance.



21st article in **Western Industry's** *plant construction series:*

NEW Hermann Safe Co., San Francisco

Replacing a rambling plant in the center of a city

WHEN a firm finds it necessary to relocate both its office and plant in a metropolitan area after 27 years in one constantly expanding location, a number of problems present themselves. The largest of these problems is to design an efficient layout based on present and future requirements within the restrictions of manufacturing in the center of a city.

Hermann Safe Co., a San Francisco firm for 65 years, recently outgrew its facilities and made plans for a new building—still in downtown San Francisco—designed to provide the most modern facilities possible for serving the banking and commercial field in the Western states.

SHOP FACILITIES, for assembly and custom work, reflect latest thinking and methods.

Reasons for deciding to maintain the metropolitan San Francisco address are, primarily, these:

1. Retail business is large in San Francisco itself (stores, industry, etc.) and the firm wanted to have facilities nearby to service these activities efficiently.

2. Head offices of the Western banking industry are mostly in San Francisco.

3. A decision had already been made to keep the administrative and operating parts of the firm under one roof, to make for a better integrated and less expensive operation.

When the old building was erected 27 years ago, electric welding equipment was not in common use. Shop activity revolved more around the use of the drill press and hand assembling. Today, customs have changed so much that the new shop layout is entirely different, incorporating fewer drill presses and more welding booths. The whole shop activity has changed complexion, and the new plant reflects the latest thinking and methods available. This new plan is more compact, yet has more floor area on one level.

As an example of the improvement in communications, in the old building the burglar alarm project superintendent was located 110 ft. from the head office and the factory superintendent 100 ft. away, in the opposite direction. In the new plant, both superintendents have offices around 30 ft. from the head office, and in the same direction.

Primary consideration in construction of the building was the floor load limit. Most of the equipment handled is quite heavy, though it does not take up much physical space. In the previous building, 337 piles were driven to support the floor (on tidelands); in the new building there are none. The floor in the manufacturing shop is a 6-in. concrete slab laid on tamped wet beach sand that goes down to bedrock. As a result, there is practically no limit to the load that can be handled.

The new building, combining sales, office, and plant facilities, is located at the corner of Market and Valencia Streets in downtown San Francisco. Rothschild, Raffin and Weirick were the general contractors for this new $250,000 structure of concrete, steel, marble, glass, and aluminum. Plans were developed by Ward and Bolles, architects. Some 3,000 sq. ft. of area are provided, with a 3,500-sq. ft. basement and a 1,500-sq. ft. mezzanine floor.

Over the basement areas, the 6-in. concrete slab has a 400 lb. per sq. ft. load limit. Shop areas are treated with two coats of Kemi-Kal to minimize dust and harden the concrete. Salesroom floors are treated to induce hardness and provide a color that is harmonious with the surroundings. All executive offices are fully carpeted; accounting and office operation areas are all surfaced with asphalt tile.

Flat roof over the crane bay is steel purlins with wood decking. Roof over the machine shop is supported by wood trusses, with a 65-ft. span.

Two of the doors from the shop to the outside are 10 ft. wide and 14 ft. high, allowing ready-mix cement trucks to roll right inside the plant and

deposit their loads where needed.

In the shop area, nearly 20% of the roof is in skylight so that it is only on really dark days that any artificial light is required at all. Lights are incandescent.

In the salesroom, the F. K. Pinney Co. installed a new type of artificial daylighting by use of a false ceiling, slimline fixtures above it, and translucent plastic squares to diffuse and distribute the overhead light.

Heating and ventilating is taken care of by overhead equipment produced by the Atlas Co. In cold weather the heaters are fired up and the warm air is circulated by built-in fans in units suspended from the ceiling. In the summer, the fans circulate air at room temperature. Air circulation in the shop is well designed and properly executed.

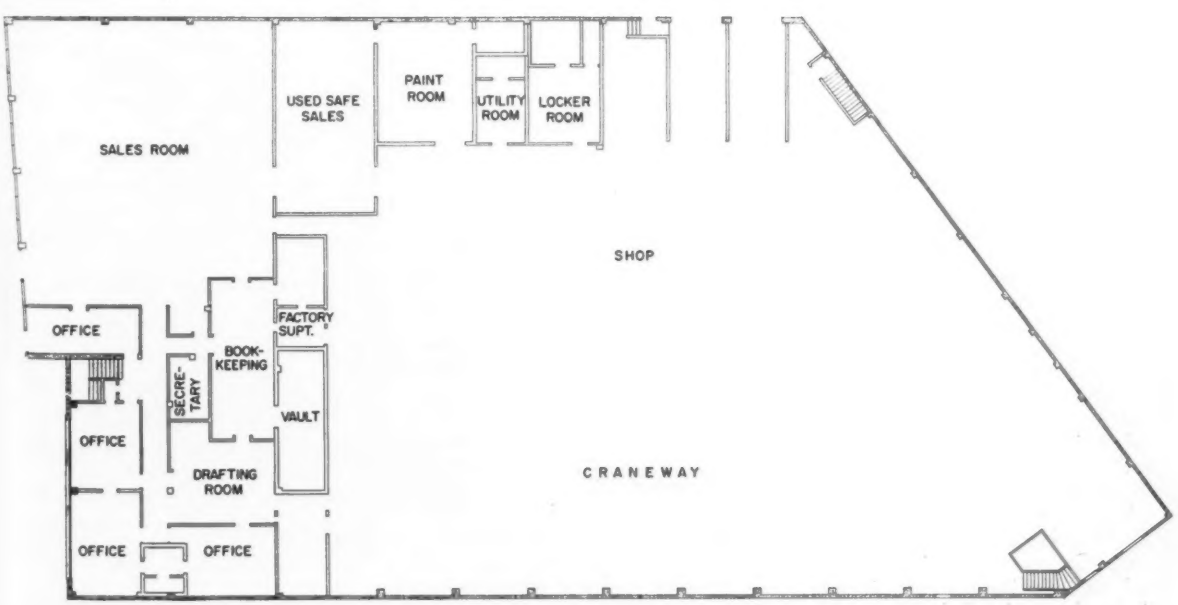
In this new plant, sales of new equipment and that of used equipment are separated. Burglar alarm equipment production and service departments are closely integrated with the other operations, which was not possible in the previous plant.

Outside walls of the building are stucco. Front of the plant embodies a show window area, about 10 ft. high and 40 ft. wide.

Who did it

ARCHITECTS:	Ward and Bolles
GENERAL CONTRACTOR:	Rothschild, Raffin and Weirick
SUBCONTRACTORS:	
Painting and decorating:	D. Zelinsky and Sons
Reinforcing steel:	Judson Pacific Murphy
Structural steel:	Herrick Iron Works
Electrical installation:	Kuchel and Sievers Electric Works, Ltd.
Roof trusses:	Timber Structures Inc. of Calif.
Office equipment:	M. G. West Co.
Acoustical tile and daylight ceilings:	F. K. Pinney, Inc.
Plastering:	Fred Meiswinkel
Plumbing:	E. Sugarman, Inc.
Roofing:	Alta Roofing Co.
Heating and ventilating:	Atlas Heating and Ventilating Co., Ltd.
Glass:	W. P. Fuller and Co.

MEZZANINE FLOOR PLAN



MAIN FLOOR PLAN

Two metal shows and expositions in March

AMERICAN Society of Tool Engineers will hold its annual meeting in conjunction with the first ASTE Western Industrial Exposition in Los Angeles, March 14-18. The exposition will be held in Exposition Hall; daytime technical sessions will be held at Shrine Auditorium, and evening sessions will be held at the Ambassador Hotel.

American Society for Metals and 24 other technical societies will hold the Ninth Western Metal Congress and Exposition in Los Angeles, March 28-April 1. The exposition will be held in Pan-Pacific Auditorium. Technical sessions will be held in the Ambassador Hotel.

Summarized technical session programs for both the ASTE and ASM follow.

ASTE

OVER 40 of the nation's leading executives and engineers will speak on current industrial production problems and technical developments at the American Society of Tool Engineers annual meeting, March 14 to 18, in Los Angeles.

The program is as follows:

March 14
PROFESSIONAL
DEVELOPMENTS DAY

2 p.m.—Shrine Auditorium. "Magnesium plate for steel lightweight fixture construction," by Raymond L. Nelson, development engineer, Dow Chemical Co.

2:30 p.m. "Industrial numbering codes." Speakers: Dr. Mortimer Taube, president, Documentation, Inc.,—"Unitherm coding of technical data," and James A. Catto, manager, Administrations Services Department, Ford Motor Co.—"Coding and administration of engineering drawings."

8:00 p.m. Ambassador Hotel. "Tool engineering research in action." Dr. Erik Henriksen, University of Missouri's College of Engineering, to speak on "Finding and directions in chip breaker design." Carl J. Oxford, Jr., research engineer, National Twist Drill and Tool Co., to speak on "Recent developments in drilling research." Leslie S. Fletcher, ASTE research fund director, to report on ASTE research into workpiece temperature distribution.

Wayne Ewing
Secretary, ASTE

H. E. Conrad
Exec. Sec., ASTE

March 15
PRESSWORKING DAY

9:30—Shrine Auditorium, "Plastic tooling for production. General chairman: Walter H. Kadlec, president, Southern California Section.

Speakers: John Delmonte, general manager, Furane Plastics, Inc.—"Improved designs for plastic tooling": Louis E. Frost, tool engineer, North American Aviation, Inc.—"Cast Plastic tooling as used in aircraft"; Richard Morozowicz, plastics engineer, Douglas Aircraft Co.—"Reinforced laminates in aircraft tooling"; George C. Adams, staff engineer, Rezolin, Inc., —"Are plastic tool standards needed?" G. J. Walkey, manufacturing research engineer, Lockheed Aircraft Corp., will be session moderator.

2:00—"Presswork tools and methods." Members of the panel: Harry Aikens, factory manager, Norris-Thermador Corp.; Max Lauderback, superintendent of metallurgy, Kaiser Steel Corp.; Alfred T. Rando, partner, B & M Engineering Co.; E. C. Rork, plant manager, Arcturus Manufacturing Co., and L. H. Trautman, Aluminum Company of America,

8:00—There will be two evening sessions Tuesday. "Advantages in leasing production equipment" by R. A. Perkins, assistant secretary-treasurer, Kearney & Trecker Co.

In the other session, "Setting goals

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P. O. Box 969, Salinas, Calif.
Phone: 2-4771

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Phone: CY 2-3606

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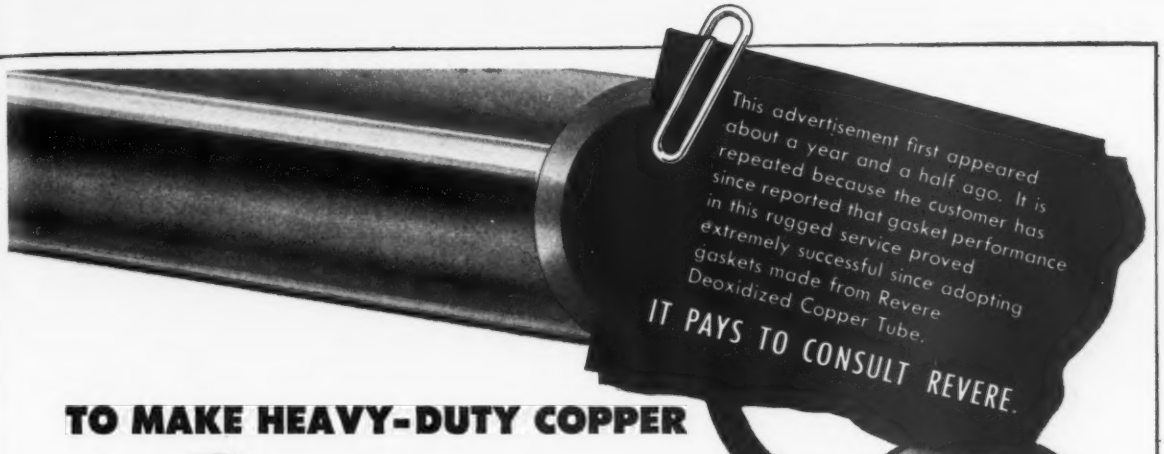

This advertisement first appeared about a year and a half ago. It is repeated because the customer has since reported that gasket performance in this rugged service proved extremely successful since adopting gaskets made from Revere Deoxidized Copper Tube.

IT PAYS TO CONSULT REVERE.

TO MAKE HEAVY-DUTY COPPER

Gaskets

USE REVERE DEOXIDIZED

Tube!

Diesel Fuel Injection Pump, made by American Bosch Corp., Springfield, Mass., and gaskets made by cutting rings off 2" deoxidized copper tube.

• An important extra service rendered by Revere consists of collaboration in setting up specifications. This is valuable because there are many different Revere Metals, each with special characteristics. No one copper, for example, will serve to best advantage in every application. A case in point is the matter of copper gaskets for Diesel fuel injection pumps. Copper is of course an ideal metal for gaskets, and is widely used for that purpose. But for this special application, which copper and in what form? The pump is used on large engines for municipal generating plants. It weighs 186 pounds, and must produce the high pressure required to inject fuel near the top of the Diesel compression stroke. Naturally, the load is a pulsating one. American Bosch Corporation came to Revere with the problem. Our suggestion was that much scrap could be saved if the gaskets were made by cutting rings off copper tube, instead of stamping them from strip. This achieved a double purpose, since the tube is made of deoxidized copper, which is superior in this application to electrolytic. We are able to report that these recommendations proved successful.... This work was done by the Revere Technical Advisory Service. To get in touch with it, see the nearest Revere Sales Office.

REVERE

COPPER AND BRASS INCORPORATED

Founded by Paul Revere in 1801

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SEATTLE: 1331 Third Ave., Main 1401

METALS SHOWS . . . Begins on page 40.

in automation" by W. Fay Aller, director of research, Sheffield Corp.

March 16
MANAGEMENT DAY

9:30 "Preparing engineers for manufacturing responsibilities." General chairman: Prof. R. E. McKee of the University of Michigan. The session will be in two parts. R. L. Hand, manager, general department 28-01, Lockheed Aircraft Corp., will be moderator for the first part. Speakers and their topics will be: L. M. K. Boelter, chairman of the Department of Engineering UCLA—"General approach to realistic manufacturing engineering curricula"; Dr. Ralph J. Smith, head, engineering department of San Jose State College—"Specialized approach to realistic manufacturing engineering curricula."

Moderator for the second part session: J. L. Crawford, superintendent of tool fabrication, Santa Monica Division of Douglas Aircraft Corp. Speakers and their topics will be: G. W. Papen, production engineering department manager, Lockheed Aircraft Corp.—"In-plant engineer training for large organizations"; D. Palmer, president, Dwight Palmer & Associates—"In-plant engineer training for small organizations."

2:00 "Gears and splines," will be the general topic. "Planning for effective gear inspection" by Fred Bohle, manager machine development, Illinois Tool Works, "Roll-flowed forming of splines and serrations" by Harry Pelphrey, chief research engineer, Michigan Tool Co.

2:30 "Selection of general-purpose vs. special-purpose machines" by D. E. Hawkinson, vice-president, machine tool sales, Greenlee Bros. & Company.

8:00 "Coordination of manufacturing management," a panel discussion.

Panel moderator: J. R. Weaver, manager of manufacturing engineering, Westinghouse Electric Co. Panel members will be E. W. Ernst, manager, machine tool equipment and planning, General Electric Co.; R. J. Gould, superintendent, Motorola, Inc.; R. J. Mountain, chief industrial engineer, Pacific Division, Bendix Aviation Corp.; A. A. Signorelli, president, Design Service Co.

March 17
PROCESSES DAY

9:30 "Tooling for nonferrous high-temperature and precision products"

"Mercury-pattern precision-cast design and tooling" by Dr. Irvin R. Kramer, vice-president, Mercast Corp. "Ceramic parts and tooling for high-temperature applications" by Dr. R. F. Rea, manager, Research & Development Branch, Stupakoff Ceramic Manufacturing Co.

2:00 "Shells and extruded products." Speakers and their topics: W. R. Powl, plant engineer, Armstrong Cork Co.—"Twenty mm. shell tooling and production"; J. F. Leland, manager, Metal Forming Division, Parker Rust-Proof Co. — "Tooling for Cold Steel Extrusion."

March 18
PRECISION CONTROL DAY

9:30 "Quality control through realistic tolerances." Moderator: William M. Ferguson, general manager, Quality Control Co.

Speakers and their topics: E. E. Bates, assistant to director, Quality Control Division, Northrop Aircraft Co.—"Opening tolerances for closer fitting parts"; C. E. Deardorff, Bendix Aviation Corp.—"Size tolerance vs. positioning tolerance"; R. F. Hurt, chief project planner, Lockheed Aircraft Corp.—"Converting engineering specifications into shop practice"; F. H. Squires, quality manager, Lear, Inc., "Who inspects the inspector?"; J. A. Broadston, armament engineer, Aerophysics Laboratory, North American Aviation, Inc.—"New slants on surface roughness."

2:00 "Ferrous and nonferrous heat treatment."

"Heat treatment of steels" by A. V. Leubbers, Jr., chief metallurgist, and R. H. Lundquist, California-Doran Heat Treating Co.

"Aluminum heat treatment" will be discussed by Dr. George Perkins, general director, Products and Application Department, Reynolds Metals Co.

ASM

TECHNICAL sessions of the American Society for Metals at the Ninth Western Metal Congress, March 28 to April 1, 1955, in the Los Angeles Ambassador Hotel, will be conducted in panel form and are designed to solve problems of the Western metal manufacturing and fabricating industries.

The program is as follows:

March 28

Morning: DIE MATERIALS AND NEW FORMING METHODS. Panel chairman: Fred M. Arnold, chief process engineer, Norris-Thermador Corp. Arnold will also talk on "Cast iron die materials."

Other topics: "Die materials applicable to advanced airframe manufacturing"; "Causes of tool steel failure"; and "Forming of stainless steels."

Afternoon: TITANIUM. Panel chairman, Dr. Walter L. Finlay, vice president and manager of research, Rem-Cru Titanium, Inc.

Additional topics: "Metallurgical principles behind today's titanium problems"; "Effects of hydrogen and temperature stress of titanium"; "Important phases of forgings of titanium for aircraft and airframes"; "Titanium for aircraft fasteners," and "Shop experience with titanium airframe parts."

March 29

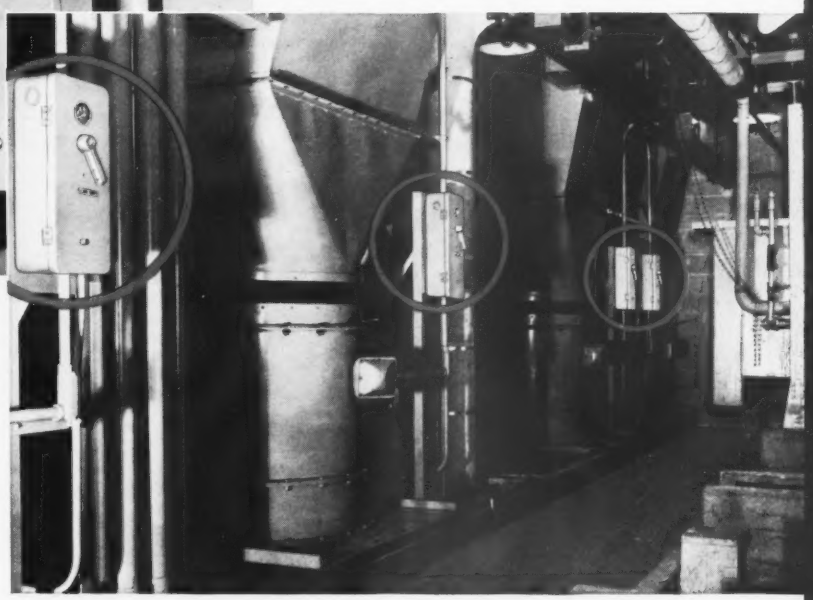
Morning: NEW METALS IN THE PETROLEUM INDUSTRY. Dr. Claude Clarke, metallurgical engineer, special steel developments, Timken Roller Bearing Co. Clarke will speak on "New high strength steels for oil

. . . More on page 46

HEAD TABLE at kick-off dinner given by Los Angeles Chapter, ASM, prior to Ninth Western Metals Exposition and Congress. Left to right: S. R. Kallenbaugh, chapter chairman and district manager, steel and tube division, Timken Roller Bearing Co.; Roy E. Pa'ne, co-chairman of ASM techn cal sessions, chief metallurgist, Vernon Works, Alcoa; Robert S. Sherwood, attendance chairman, vice president, California-Doran Heat Treating Co.; Henry A. Curwen, chapter publicity chairman, metals engineer, Earle M. Jorgensen Co.

A neat, compact line-up of Allen-Bradley Bulletin 712 combination starters in the control room of a large chemical processing plant. Starters can be padlocked in "OFF" position.

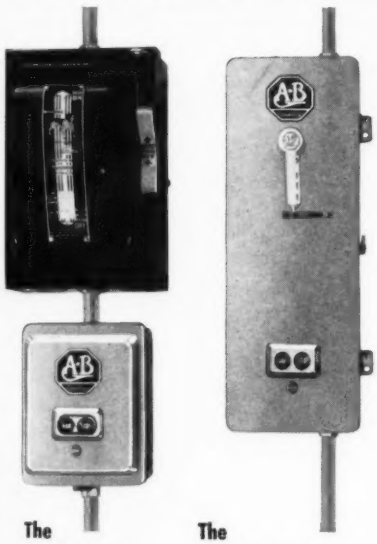
A row of Allen-Bradley Bulletin 712 combination starters in metal finishing plant. Note the simplified wiring which is possible when disconnect unit is in same enclosure with starter.



ALLEN-BRADLEY COMBINATION STARTERS

Save wiring costs
Save Space

Assure safer and neater motor controls



The **OLD** Way

Separate disconnect mounted above and wired to motor starter. Difficult to do a neat appearing wiring job.

The **MODERN** Way

Bulletin 712 combination starter with disconnect. Cannot be opened unless disconnect lever is "OFF."

STREAMLINE your MOTOR CONTROLS

by using A-B Combination Starters

The Allen-Bradley line of combination starters is available in two general types—Bulletin 712 with manual disconnect switch and Bulletin 713 with automatic I-T-E circuit breaker. In addition to the standard NEMA Type 1 pressed steel enclosure, these combination starters are furnished in watertight, dust-tight, and semidust-tight enclosures, as well as in enclosures for hazardous gas and dust locations. For complete information, please write for the Allen-Bradley 120-page Handy Catalog.

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1316 S. Second St.
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In Canada—
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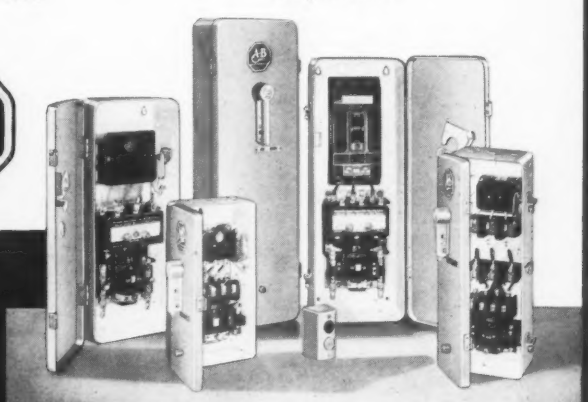
A-B Quality



Allen-Bradley Combination Starters

1-55-M

ALLEN-BRADLEY
COMBINATION STARTERS
QUALITY

DRUM SWITCHES

Bulletin 365 MULTISPEED DRUM SWITCHES for 2, 3, and 4 speed motors.

Bulletin 806 DRUM SWITCHES for pilot control and transfer switch service.

Open View of Bulletin 350 Drum Reversing Switch on Worthington welding positioner. Available up to 20 hp, 220 v; 40 hp, 440-550 v. For d-c motors up to 3 hp, 115-230 v.

MANUAL CONTROLS

for Alternating & Direct Current Motors

There are many types of motor-driven machines for which a simple drum switch is the most suitable type of manual control. For such applications the Allen-Bradley line offers a wide variety of types and sizes of drum controllers up to 300 hp, 220 v; 500 hp, 440-550 v.

Practically any combination of switching operations can be arranged by the proper combination of drum segments and contact fingers. For complete information on Allen-Bradley drum controllers, send for the 120-page Allen-Bradley Handy Catalog.

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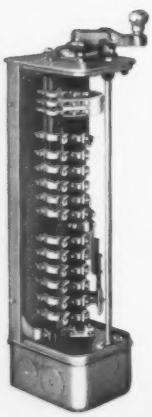
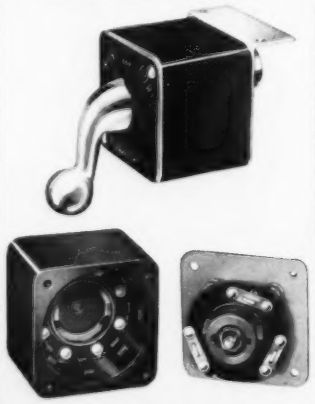


Bulletin 375-385 DRUM SWITCHES for polyphase, wound rotor induction motors.

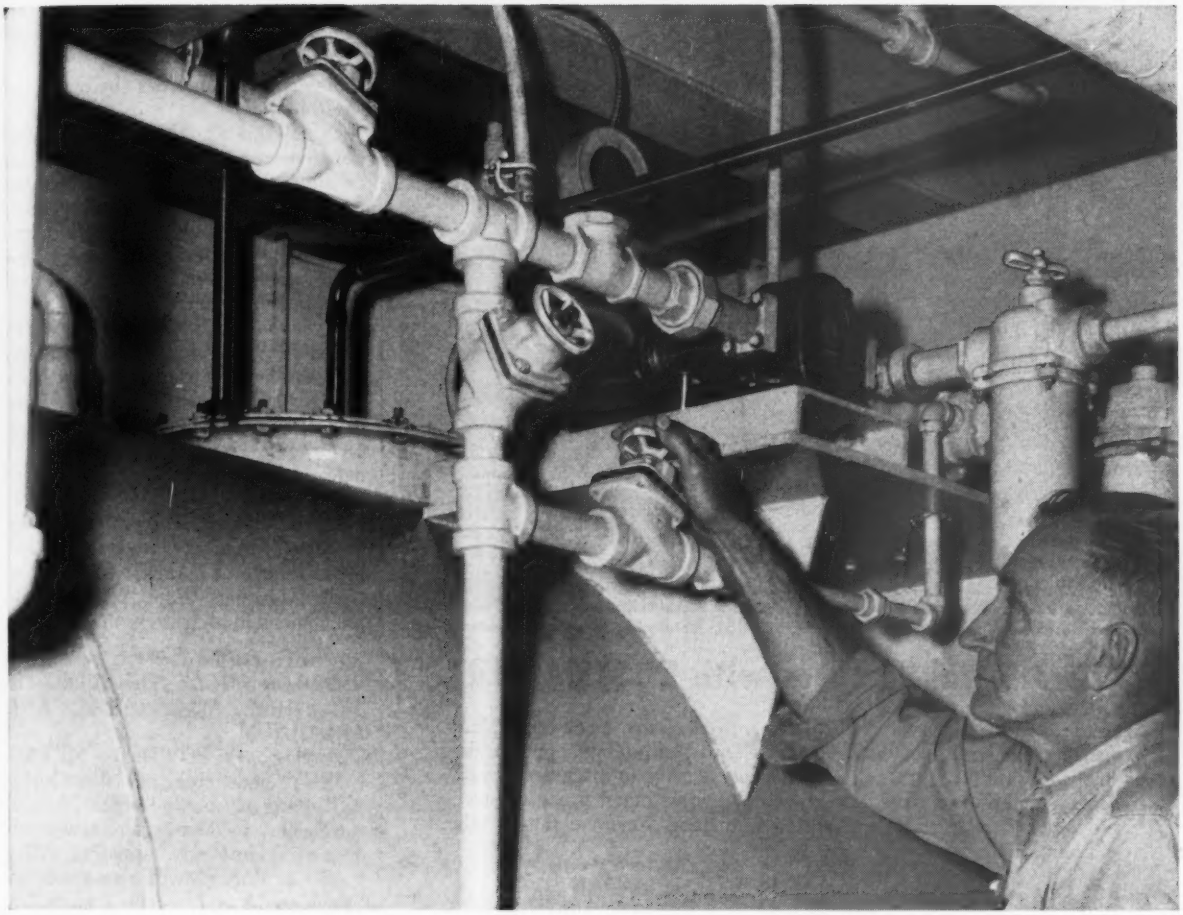
Bulletin 350 Low Cost STYLE A DRUM SWITCHES for polyphase motors up to 1½ hp, 110 v; 2 hp, 220-440-550 v.



For Single Phase Motors up to 1 hp, 110 v; 1½ hp, 220 v. D-C motors— ¼ hp, 110-220 v.

ALLEN-BRADLEY
QUALITY
MOTOR CONTROL

1-55-M



Light oil meets its master in these CRANE VALVES

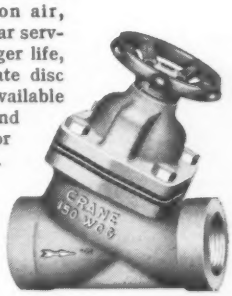
THE CASE HISTORY— Read how the Johnson & Johnson baby products plant at Cranford, N.J., completely stopped a valve leakage condition that wasted product . . . caused a safety hazard . . . and menaced the plant's high sanitation standards.

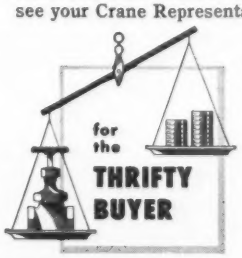
Valves formerly used on very light baby oil lines were the source of trouble. Keeping them tight at the stuffing box was next to impossible. Constant servicing of stuffing boxes was necessary, even after repacking every 4 to 8 weeks. Several packings were tried without success while the high maintenance costs and nuisance conditions continued.

Early in 1951 the plant found the solution in Crane No. 1610 Packless Diaphragm Valves. They removed the cause of leakage —immediately stopped its troubles and costs. Almost 4 years later—with no maintenance whatsoever—the Crane packless valves remain absolutely tight; continue giving perfect service. And that goes for all valves added since the first installation.

Crane No. 1610 Packless Diaphragm Valves

When you have valve problems with hard-to-hold fluids, try Crane *Packless* diaphragm valves. They eliminate stem leakage and maintenance on air, vacuum, gas, light oil and similar services. Their diaphragm has longer life, yet should it fail, their separate disc prevents escape of line fluid. Available in wide selection of materials and sizes. Ask for folder AD-1942 or see your Crane Representative.





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METALS SHOWS ... Begins on page 40.

well drilling," besides being panel chairman.

Other topics: "Hard facing and abrasive resistant alloys used in oil drilling"; "Hydrogen embrittlement encountered in the oil industries"; "Metals in high temperature application in the oil industry," and "New developments in materials for oil well pumping equipment."

Afternoon: HIGH STRENGTH STEELS. Panel chairman: Dr. A. R. Troiano, head of Department of Metallurgical Engineering, Case Institute of Technology. Troiano will also speak on "Static fatigue and hydrogen in the delayed failure of high-strength steels."

Other topics: "Discussion of the problem of high-strength steels"; "Delayed failures"; "Anistrophy in heat-treated forgings"; and "Initial yield phenomena in high-strength steels."

March 30

Morning: HEAT TREATING OF TITANIUM, MAGNESIUM, AND ALUMINUM.

Afternoon: POWDER METALLURGY. Panel chairman: Dr. George A. Roberts, national president, American Society for Metals, and vice president of Technology, Vanadium Alloy Steel Co. Roberts will also speak on "Powdered metal structural parts."

Other topics: "Powder metallurgy for magnetic purposes"; "High-strength, high-temperature parts"; and "Cutting tools and structural parts."

March 31

Morning: ATMOSPHERE FURNACES, SALT BATHS, INDUCTION HEATING AND HEATING FOR FORGING.

Afternoon: METALS FOR THE ELECTRONICS INDUSTRY. Panel chairman: D. M. Van Winkle, Materials Processing Section, Hughes Aircraft Co. Van Winkle will also talk on "Metallurgy of germanium and silicon used for transistor and diodes."

Other topics: "Magnetic materials for electron equipment"; "Metals and materials for resistors and capacitors," and "Application for special glazing alloys and procedures for joining electron components."

The two morning sessions on heat treating will be ASM sponsored but presented by the Industrial Heating Equipment Assn. In addition to ASM and IHEA, the American Welding Society, Society for Non-Destructive Testing, and the Los Angeles Chapter of American Foundrymen's Society will hold sessions.

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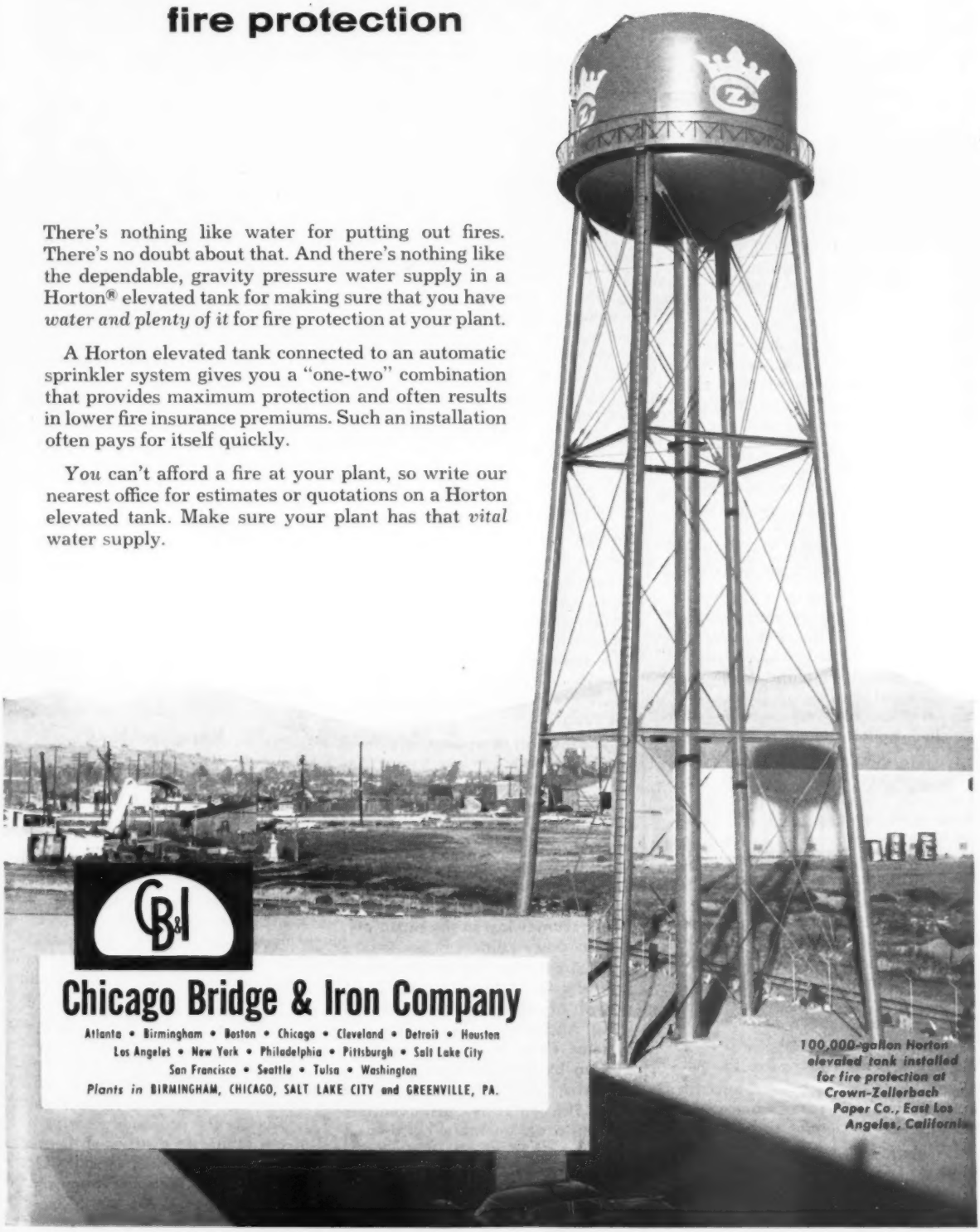

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EARL E. R. JONES
Engineering Extension
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THE small company has some excellent features. In fact, large companies spend considerable time and effort attempting to duplicate them so as to secure some of the advantages found in small organizations.

Among the advantages is the flexibility of operations, in terms of products, services, and geographic operation. It is easier to make changes as needed, and the small company is committed to shorter-range objectives.

Favorably affecting the operation of the entire organization are the close personal relationships that exist, although at times they may be detrimental because they inhibit the proper sounding out of all opinion on problems and the adequate recording of decisions, policies, and directives.

For the individual, the small company provides satisfactions in permitting the exercise of complete functions, in performing integrated jobs, in seeing the entire operation, and in being able to identify one's self closely with the company's progress.

Taken together, these advantages provide a great potential for success of the small company; whether or not it can be realized depends on how well the organization is managed. Small companies get into difficulties more often because of poor management than lack of capital.

What is needed to realize the potential?

There are no pat formulas or standard sets of actions to be taken, and trite as it may sound, each company is different in terms of its existing needs and strengths. Consequently, each will need to develop solutions by placing emphasis on different aspects of its operations.

Uncovering answers to the following questions may provide some indications:

1. Is the company performing as well as it can?
2. What is it doing to improve its position in the market through (a) reducing costs and prices, (b) improving quality, (c) shortening delivery time, (d) improving the reliability of its service?
3. What is it doing to realize to the maximum the available growth potentials?

What the survey revealed

This survey, to detemine the actual management methods of small manufacturing companies in the San Francisco Bay area, the nature of the differences between small-plant and large-plant management, and what small companies should do to overcome their deficiencies, revealed the following:

1. Most small companies are doing a fair job.

2. Major deficiencies are:

(a) Concentration of functions in the hands of the general manager.

(b) This "one-man management" inevitably severely overburdens the company's key man, who becomes lost in the maze of day-to-day routine.

(c) A contributing factor is the failure actively to encourage the growth of subordinates.

(d) Absence of simple formal systems adds to the manager's burden by leading to a lack of control.

(e) The company consequently slips into an unstable hand-to-mouth method of operation because top management cannot devote adequate attention to the vital functions of planning and scheduling.

One of the greatest problems a company faces, once it sees the need to improve its methods of management, is determining what should be done and where to start. For this a special committee may be formed representing all levels of management, to identify problem areas and indicate the order of their importance.

It may be possible to secure the assistance of a consultant, who can best help in reviewing the status of operations and plans for proceeding, and providing the proper orientation. Much lost time and effort can be saved by skillful advice in developing adequate and suitable plans.

In selecting a consultant, care should be exercised in choosing one of high repute specifically interested in small companies.

Beginners in the improvement of management methods should not expect to do a perfect job, but they do need to develop sensitivity to indicate along which lines they should move.

Major problems

Although we prefer a special study committee for identifying and developing solutions for the major problem areas of the company, this task may be carried out by one of the executives as a special assignment.

This survey has indicated that many serious problems confront a wide segment of small businesses. A number of these are related to organization structure and to specification of duties and responsibilities.

Deficiencies exist because of the extensive scope of the manager's responsibilities. This results in a failure to identify functions performed, and to develop proficiency in them. Related to this are the problems growing out of the failure to distinguish between and separate: (1) policy-making from operations, (2) planning from executing.

Organizational difficulties exist because of the failure properly to dele-

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gate responsibility and authority and to specify duties and accountability. This frequently leads to one-man management. The almost universal failure to develop managerial and executive talent, either by explicit training and development, or by permitting a high degree of initiative to be exercised by subordinates. It results in:

1. A serious lack of depth in managerial positions which threatens the continuity of the company.

2. The almost complete lack of staff activity other than that needed to meet legal requirements, such as accounting and taxes.

Problems on the operating level include these:

1. Maintaining a stable work load and work force and providing for the individual's security, stability, and progress in the company.

2. Developing methods for making available operating capital.

3. The extent to which informal practices should be standardized and formalized for smoother, more routine operation.

4. Lack of adequate controls which results in the need for personal follow-up by the manager on the myriad details of daily operation.

What business?

Management must first determine what business the company is actually in. This may sound like a simple and obvious determination, but uncovering this information requires considerable patient review and the ability to step back from everyday operations to secure a more encompassing view of the business.

An experience of one of the authors may serve to illustrate this point. A company fabricating industrial textile products employing about 100 people saw its business as making and selling these textile products.

A review of operations and a skillful examination of sources of income revealed that the company was not in that business at all. In fact, it was doubtful whether the manufacture and sale of its products contributed much, if anything, to its profits.

The greatest source of profit lay in the astute buying and warehousing of raw materials. It was as much a local supplier of raw materials for its industry as a manufacturer.

Management then saw that it was in two very different kinds of businesses and could decide whether it wished to continue both. It then proceeded with evaluation to help it decide, and with planning to implement its decision.

Secondly, management must determine what business it wants to be in. The small business in particular needs to undertake an evaluation of the profitability of each of its products and product lines. It can then determine what kind of organization will be needed and how it may be put together by function, structure, and size.

Improving the organization

For most small companies, this can well begin with organization planning which results in two formal organization charts, one immediately useful, and the other for the long term. Planning should be carried out by a special committee on organization planning appointed to help the chief executive.

An analysis of functions performed will aid in the identification and specification of positions. The limits of activity, responsibility, and authority of every position should be defined and should specify the methods of accountability. The charts then make this common knowledge for all.

A desirable organization structure permits decision-making to take place on the lowest levels of the company compatible with the activity or function in question. This will permit the development of initiative and competence of lower ranking managers and supervisors and relieve top management of many routine and semi-routine matters.

The small company may be helped considerably by providing for a position of assistant-to-the-chief-executive. Such an organizational device would serve two purposes: (1) relieve the chief executive of many details and functions, allowing him time for long range planning, and (2) permit the development of executives to provide depth at this most vulnerable position in the organization.

It may be well to recruit a young engineer, particularly one trained in production management, permitting

Sources of aid

1. Strong local associations or groups of similar small businesses, which can permit members to compare methods and operations, exchange information, and identify and develop solutions to common problems. An association can much better afford to retain a consultant to work on common problems and develop market information. It could even engage in institutional advertising and deal as a group with government agencies or prime contractors. It could deal more readily with private research institutes, state agencies, and public agencies such as the universities for providing training, research, or advice.

2. U. S. Department of Commerce, through its local offices, can provide not only data, but advice on the kinds of data available and how to use them. Other government agencies able to provide assistance through data and training are: Department of Labor, Bureau of Labor Statistics, Bureau of Apprenticeship, National Bureau of Standards, Small Business Administration, Patent Office.

3. National and regional trade associations provide information through publications, and on occasion can offer management advice if requested.

4. State and local chambers of commerce and banks are most helpful in providing information and counsel.

5. Technical and professional societies, with their publications, meetings, classes, and opportunities to discuss problems with others.

6. National management education groups, such as American Management Assoc. and National Industrial Conference Board.

7. Consultants and part-time assistance from university faculty members and graduate students working on management problems.

8. Public educational institutions, through their comprehensive lists of books and periodicals for systematic reading and their extension activities available for needed training and research findings. Courses of study in management, production, marketing, engineering, accounting, finance, etc., are presented in evening classes in most of the major population centers.

9. Conferences and other special daytime programs of one to ten days duration offered by educational and professional groups.

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him to work in all of the functions with the goal of assuming the assistant-to position.

Strengthening the organization also requires evaluation of the capabilities of supervisors and executives so as to place each in the position best for him and the company. This may be undertaken by means of a pooled review or group rating made by superiors of their subordinates. There may be a few cases for which management may wish to acquire the assistance of a competent psychologist or management expert. Although this is somewhat expensive, it is money well spent, for executive evaluation is often best undertaken by outsiders.

Frequently, the limitations in the capabilities of members of the organization make it necessary to modify the organization structure. This should be done only as a short term necessity. When the capabilities of individuals are known, so are their areas of weakness. This provides the basis for corrective action and for their future improvement and development.

Serious consideration should be given to providing depth in each position by planning for the rotation of jobs among managers and supervisors and for having junior supervisors understudy positions senior to them.

Where authority and responsibility are delegated, as they should be, top management is responsible for instituting controls that permit rapid identification of errors so that corrective action can be taken quickly to head off serious consequences.

Planning and controlling

The goal of planning and controlling is the development of the necessary systems and procedures that will permit the company to operate under the exception principle. This requires that careful and realistic plans be developed in advance, and that adequate, yet simple, methods of follow-up be installed so that variations from the plans are reported in time to take corrective action.

Among the primary plans needed is the sales forecast by dollars and units, which in a small company is much too informally and intuitively developed. To develop greater accuracy, better use should be made of such information sources as dealers, distributors, and the reports of the U. S. Department of Commerce, Bureau of Labor Statistics, banks, chambers of commerce, trade publications, etc. Integrating such information with the history of company sales to develop an index useful for prediction is exceedingly helpful.

A realistic sales forecast provides the basis for developing all of the needed production plans. These include manufacturing planning, which is concerned with developing:

1. The best manufacturing processes, work methods, and plant layout.
2. A production schedule which seeks to stabilize the work load and personnel required and to provide the needed product at the needed time with minimum inventory.
3. A materials purchase plan that provides materials when needed with minimum inventories.
4. A maintenance plan providing preventive maintenance.
5. Cost planning, including estimating, pricing, and the development of standard costs with the ultimate of developing a budget.
6. A financial plan.

Planning without controls leads to chasing, expediting hand-to-mouth operating, broken delivery dates, and excessive costs. Adequate controls require the establishment of simple reports at critical points, so that variations from production schedules, quality, and costs are immediately noted, and anticipated shortages of materials

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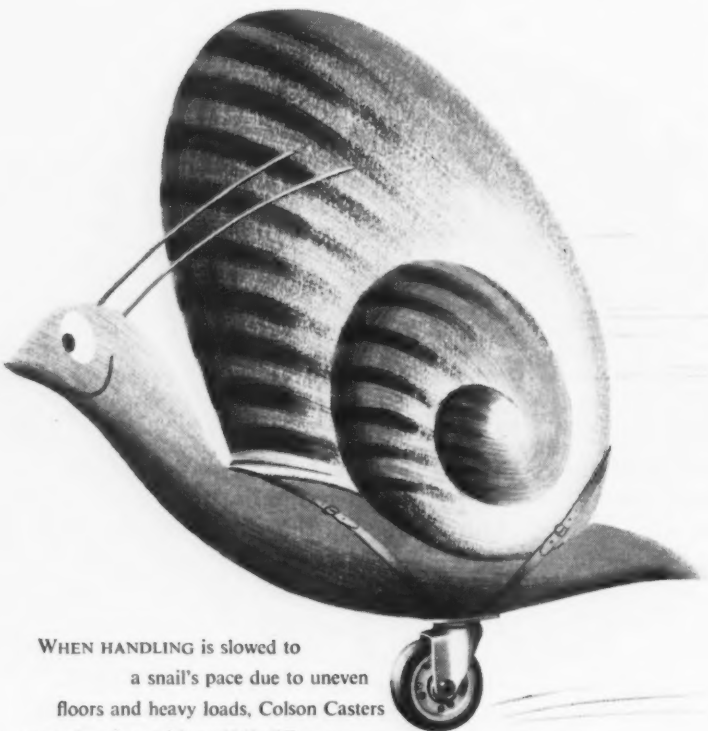

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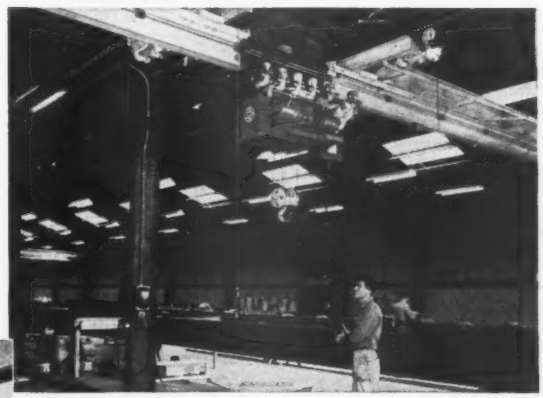

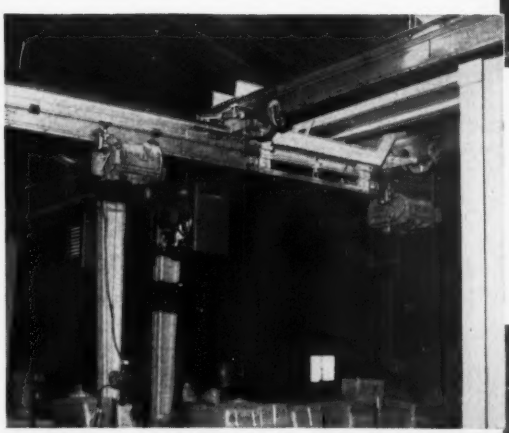

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are noted in advance of needs. If budgets have been developed, they serve as an overall control of the entire operation. However, a budget is not as immediately sensitive as the controls needed to keep schedules and quality in line with plans.

Training

Interest in personally running all phases of the business has given way to an interest in building men to run the day-to-day operations. The organization, facilities, plans, and controls are of little value without competent men who can put them to effective use. Competence is developed through training and experience; it is sustained by opportunity, recognition, encouragement, and cooperation.

Training is the imparting of skills and knowledge. It represents an ordered and integrated group of other peoples' experiences.

Supervisory and executive training, if properly executed, provides depth in the ranks of management. Serious lack of depth is one of the more notable shortcomings of the typical small firm. Only by gaining it can top management find relief from the need for constant attention to the innumerable details of day-to-day operation and find time to carry out the neglected functions of planning and control.

The worker who is promoted into the ranks of management is usually one who has a mastery of mechanical skills with little attention to the candidate's ability as a leader. For all levels of management, training in the essentials of leadership is vital to the success of any enterprise.

It is imperative also to take measuses to train an effective work force. Not only are the immediate needs of the production facility thus served, but an invaluable long-range source of managers is made available. Further, training and upgrading of personnel from the ranks is a morale booster, for it represents management's recognition of the worker's skills and loyalty.

Typical training in the small firm consists simply of indoctrinating new employees. Instruction is usually given by the foreman, who must sandwich this between frequent interruptions to keep production moving.

At best, such training can acquaint the new employee with only certain company rules and provide limited information about a specific work assignment. Left unconsidered and undeveloped are the latent abilities of many experienced workers, whose experience is too often considered sufficient training for the development of finished craftsmen. Of course, experience can be gained with time, but time on the job is not enough, else all old-timers would be company officials.

Before undertaking training, several questions must be considered: (1) who should be trained, (2) what training should be given, (3) how should it be presented, (4) how can the small company carry on training.

Furthermore, all levels of management should be afforded an opportunity to learn how to manage. Large companies have recognized this and a major shift in emphasis in their training efforts has resulted. The training of managers now addresses itself to such questions as: How are men welded into a loyal, active, and effective force? How is the spark of initiative kindled? How should the company's functions be delegated and what authority should accompany such delegation? How can control be made effective without becoming unwieldy or oppressive?

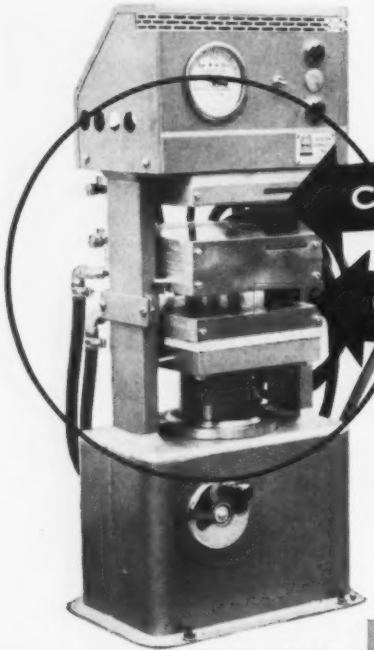
How to train

Many approaches to the "how" of training are available to the small firm. Within the organization, training can be conducted by plant personnel informally. There is a danger here, however, in that the press of work may result in a discontinuation of the program before concrete results become evident. This will be most apt to occur when the teacher is a key man in an informally organized company.

Instruction may be given managers and potential managers by means of the understudy method and job rotation in off-peak periods. Publications describing these methods are available from the American Management Association in New York City. External assistance is available from trade and professional associations and the federal government at little or no cost. Universities, through their evening extension programs, stand ready to assist. Often a suggestion for a course not already offered will lead to the organization and presentation of material of particular benefit to specific groups.

University faculties are available for discussions concerning the kinds of consulting services a business might best seek. Finally, there are professional consultants of a hundred specialties who can serve as advisors and teachers on a part-time basis.

Ed. Note: A previous list of other surveys omitted Prof. C. E. Keachie's of University of California on how plant investments are decided.



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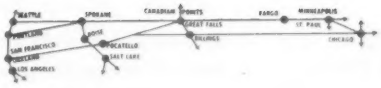

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1. Industry on the move, covering the topics "Industry moves West" and "Industry moves East" (from the West Coast to Arizona).

2. What Arizona has to offer industry, with Daniel E. Noble, vice-president of Motorola, Inc., speaking for central and southern Arizona, and C. H. Zachry, president of the Southern Union Gas Co., for northern Arizona.

3. The impact of industrial development on Arizona and its communities, with Wesley P. Goss, vice-president and general manager of the Magma Copper Co., as chairman and Herbert A. Leggett, vice-president of the Valley National Bank of Phoenix, and John Beatty, director of the Phoenix planning department, as the main speakers.

4. The coordination of industrial development in Arizona, with Stanley Womer, manager of the Arizona Development Board, and Andre M. Faure, director of the City-County planning department of Tucson, as speakers.

The final luncheon speaker will be Stuart Parry Walsh, director, Industrial Survey Associates, San Francisco, on the topic of getting the information industries want and following through.

Joint sponsors are the Chamber of Commerce of the United States, Arizona Chamber of Commerce Managers Assoc., Arizona Development Board, Arizona Municipal League, and the College of Business and Public Administration and the Bureau of Business Research, University of Arizona.

Inquiries regarding the conference should be addressed to Dr. L. W. Casaday, director of the Bureau of Business Research, University of Arizona, Tucson.

REMOTE
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with
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POWER operated VALVES
Hand Valves
Foot Valves
Instant action of remotely located or automatically operated cylinders is made possible with the new and improved Ledeen Power Operated Valves. These disc-type valves are positive in operation, and are readily adaptable to a wide variety of pilot controls. Solenoid operated power valves are available as complete package units.
Ledeen Power Operated Valves are fast cycling, have few moving parts, and require very little maintenance. They are available from stock for quick delivery.
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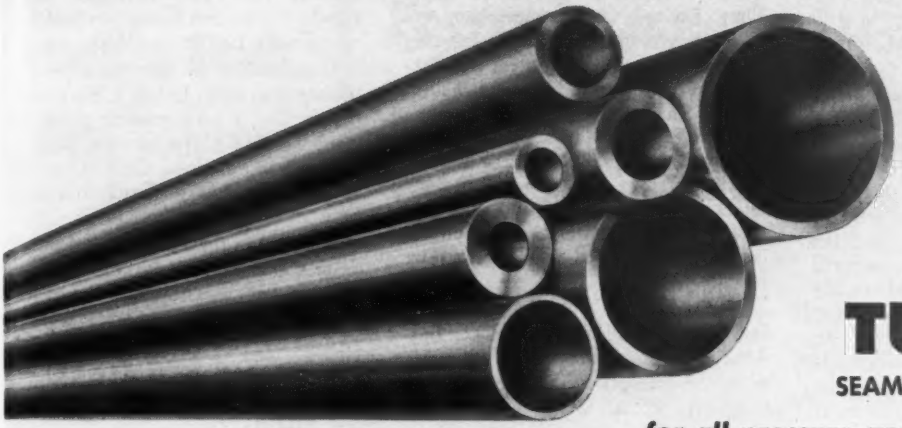
APOLOGIES TO S.P.

THE brodie that WESTERN INDUSTRY pulled on Southern Pacific Company in the January Western Outlook number shouldn't be mentioned in polite society. The railroad review credited S.P. with $120,000 in shop equipment in the eleven Western states. This figure actually was the amount invested during 1954, whereas total investment runs into millions.

MAINTENANCE SHOW and conference

THE DATES of July 12-14 have been set for the second Western Plant Maintenance and Engineering Show and Conference to be held in Los Angeles. The show will be at Pan-Pacific Auditorium and the conference at the Ambassador Hotel.

Exhibits will cover a wide range of products and services ranging from humidity controllers and insulation materials to speed reducers and generators. The conference will cover the basic principles of plant engineering from both the managerial and direct production viewpoints, scheduling of operations, training, and a broad range of specific maintenance and engineering procedures.



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for all pressure and mechanical uses

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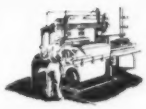
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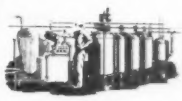
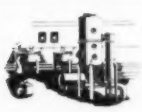
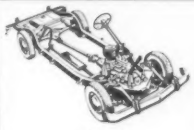

DAIRY

MARINE


FOOD

PAPER

AIRCRAFT


AUTOS

TYPES: Seamless—hot-finished, cold-drawn, or roto-rocked
Welded—from hot-rolled or cold-rolled strip

SHAPES: Round, square, rectangular, oval, or other shapes

GRADES: Stainless Steels—B&W Croloys 12 to 27
Intermediate Chrome Molybdenum Alloys—B&W Croloys ½ to 9
SAE-AISI Alloys and Nitralloy Steels
Nickel Steels—B&W Nicloys 3½, 5, and 9
Carbon Molybdenum Steels—in various grades
Carbon Steels—in various grades

SIZE RANGE: Up to 9⅝ inches outside diameter in a wide range of wall thicknesses.

SURFACE FINISHES: As rolled, as drawn, as welded, flash removed, turned, scale-free and polished.

SPECIFICATIONS: Made to any of the standard specifications such as those of the ASTM and U. S. Government.

QUALITY: Open-hearth and electric-furnace steels, including aircraft and magnaflux qualities.

CONDITION: Unannealed, annealed, tempered, normalized, or otherwise heat-treated as required.

FABRICATION: Upsetting, swaging, expanding, bending, safe-ending, and machining.

B&W SEAMLESS and WELDED TUBES

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TUBULAR PRODUCTS DIVISION
Beaver Falls, Pa.—Seamless Tubing; Welded Stainless Steel Tubing
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TA-4064(G)

QUALITY CONTROL for candy

ON A NATIONAL BASIS, the candy business was a little poor in 1954, but the West did a good deal better than the nation as a whole. Nevertheless, the candy market expansion is having some difficulty in keeping up with population growth.

The candy bar business fell off alarmingly during the year, and the best moving item appeared to be hard packaged candy selling at less than 50c a bag.

Sears, Roebuck and Co., with an eye to buying as much of their goods on standard specifications as possible, advised the candy manufacturers of the country that after three years from the spring of 1954, they would only buy candy that met specifications and quality control acceptable to them. They invited candy manufacturers from all over the nation to a meeting to show how quality control and laboratory testing could benefit the industry. So far, one firm, Thompson's Candy House in Seattle, has instituted a program of quality control and inspection. The program was put into effect for less than $5,000 and this relatively small candy manufacturer is extremely pleased with results thus far.

The size of the industry at least as far south as the San Francisco Bay Area has remained about the same, with the exception of a new large company, P. A. White Co. in San Francisco. This makes one more large manufacturer for the area (large being a half million pounds a month or more). The other two are Sierra Candy Co. in San Francisco and Chiodo Candy Co. in Oakland.

Competition in this area is now tighter than ever. In late 1953 Tuxedo Candy Co., a very modern plant, became a wholly owned subsidiary of Safeway in San Jose, Calif. This took another bite out of California business.

Business in the Pacific Northwest is quite good, with Brown and Haley of Tacoma and the Imperial Candy Co. of Seattle the biggest operators.

Manufacturers-wholesalers sales of confectionery
(in thousands of dollars)
from Bureau of Census

	1950		1953		1954* (19 months)
	No. of ests. reporting	Sales	No. of ests. reporting	Sales	Sales
Mountain	25	$6,765	21	$6,303	$3,805
Colo. and Idaho	8	1,347	6	1,239	.....
Ariz., N. M., Utah	17	5,418	15	5,064	.....
Pacific	137	45,095	100	46,809	32,554
Wash., Ore.	33	8,341	25	8,607	5,975
Calif.	104	36,754	75	38,202	26,579

*No. of establishments reporting same as in 1953.

MORE RUBBER TIRES for industry

A TREND toward palletized storage and increasing movement of warehoused goods requires greater use of rubber tires within industrial plants, according to P. W. Stansfield, B. F. Goodrich Co. He further states that zero pressure tires are displacing small pneumatic tires where punctures are a problem. Solid tires have a definite place and are not destined to die in industry as they did in highway truck service.

Puzzled by supplier problems?

The answer's in the YELLOW PAGES!

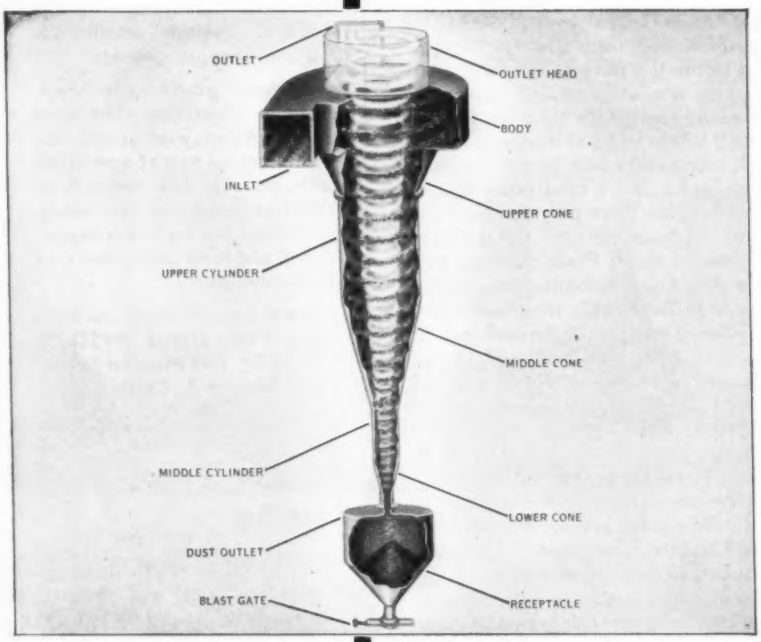
Nothing puzzling about the Yellow Pages. They're full of clear, concise information about the people you want to reach—who they are, what they have to offer, where you can see them or call them. Many alert suppliers also list the brands they carry, delivery areas and business hours. So, don't be puzzled—be practical. Use the Yellow Pages to find local folks who serve or sell.

You'll find it fast in the YELLOW PAGES!

Pacific Telephone

American Blower Dust Collectors

Recover valuable materials, eliminate nuisances



Mechanical type collectors offer high efficiencies over wide range

Simplicity in principle and design is the key to the efficient operation of American Blower Type D Dust Collectors. There are no rotating parts to adjust or repair. No water, oil or other collecting substances, which might cause corrosion or plugging, are used.

As a result, American Blower high-velocity mechanical collectors are widely used in industry as a means of eliminating a dust nuisance or to recover valuable materials from air.

If you have a problem in dust collection, consult the nearest American Blower Branch Office, or write stating your requirements.

Complete dust laboratory to serve you

Technical information, obtained from thousands of tests in our laboratory and in the field, has provided our engineers with an extensive file on dust problems and covers thousands of dust samples. Engineers are invited to make use of our complete dust-research laboratory where tests can be made on commercial-sized collectors.

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EFFICIENCY KINKS

AIRCRAFT WING CABINET
saves Convair money

PRODUCTION costs are being cut at Convair's San Diego plants by use of a desk-file cabinet holding blueprints, inspection reports and other records required during assembly. File moves with wing along the production line.

AUTOMATIC WIRE MACHINE
cuts, stamps, measures

AN ELECTRONIC, push-button machine which cuts, stamps, and measures electric wire in one operation has been put into service by Douglas Aircraft Co.

The machine, believed to be the only one of its kind in the aircraft industry, was designed and developed by Glen Lydolph, leadman in the missiles project at the company's Santa Monica Division.

This compact device eliminates five manual operations and greatly reduces the time required to assemble the electrical wiring symtems used in modern aircraft and missiles.

Eight of the machines already are employed in the production of DC-6/7 type transports and missiles, while another nine are under construction for use in other divisions.

In a single operation, the Lydolph machine measures, cuts, counts, and stamps identification numbers on insulated electric wire. More than 16 miles of such wiring is installed on each transport of the DC-6/7 type and even more is used on more complex military aircraft, company officials pointed out.

DOUGLAS leadman and wire cutting, measuring, stamping machine that he developed.

SPECIAL HOPPER
cuts car unloading time

THE time-consuming task of unloading white sand from rail cars is now accomplished much faster and more safely by the Electric Steel Foundry Co. of Portland, Ore. Two special hoppers have been fabricated by ESCO that can be loaded by a Hyster "20" lift truck with scoop attachment working inside the railway car. The 4-ton hoppers are self-dumping and portable, and replace the old 1-ton buckets which had to be hand-dumped.

It used to take four men three hours to unload a car of sand using the old buckets. Now four men are used for about ½ hour, or until the doorway is clear of sand. From then on, two men can finish unloading the car in one more hour. This is accomplished by placing one hopper on each side of the car; while one is moved to the storage bin, the other is loaded with a special scoop lift attachment on the lift truck.

Since the new hoppers hold four times as much as the old ones, the number of crane trips is cut from 48 to 12. The boxes are self-dumping—a safety feature. Using the old bucket, a man had to remain on the top of the sand bins and hand-dump the hopper. Now the crane operator lowers the hopper into the bin and a lever mechanism is tripped, opening a door in the bottom of the hopper and allowing the sand to flow into the bin.

SCOOP-equipped lift truck unloads white sand into self-dumping portable hoppers.

Contributions wanted

For each contribution to Efficiency Kinks which the editors feel merits publication, WESTERN INDUSTRY will be happy to award $5.00. Please send in any details of how your plant solved some problems of design, production, maintenance, or process.

We are particularly interested in ideas that contribute to the efficiency of production and the reduction of operating costs, novel or new methods of pollution reduction and waste utilization, as well as adaptation of old tools and processes to do new jobs.

Send contributions to Efficiency Kinks Editor, WESTERN INDUSTRY, 609 Mission Street, San Francisco 5, Calif.

RAILROAD CAR PLATE
cuts handling

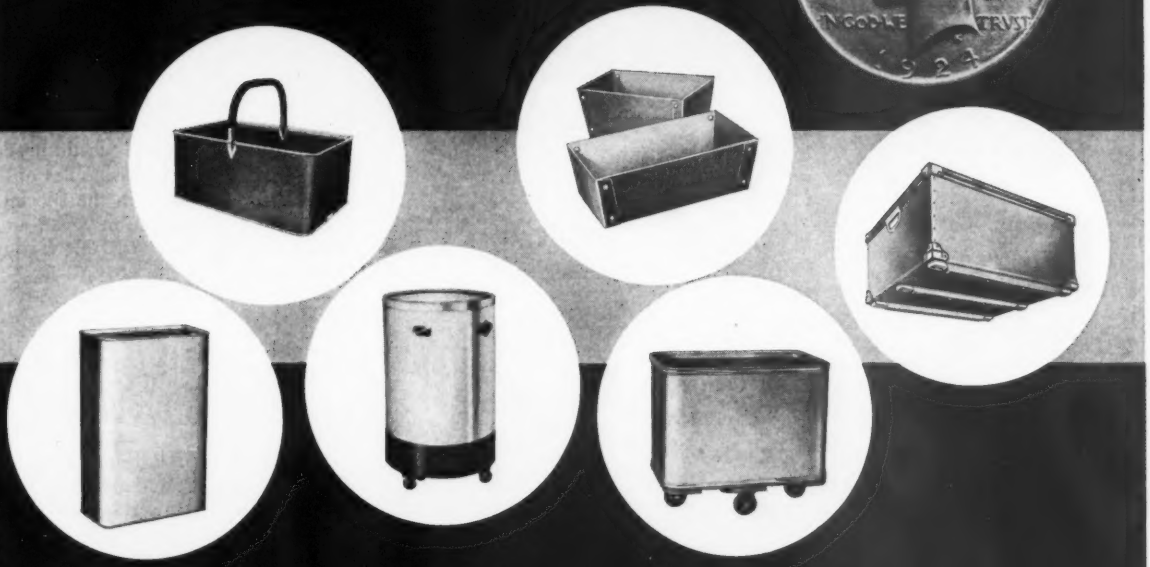
A NEW TYPE of railroad car plate that is easier, safer, and cheaper to handle has been devised by San Francisco Port of Embarkation employee Harold J. Pugh. Additional plates are now being produced and Pugh has been awarded $100. Old-type plates consisted of a flat piece of heavy metal with holes punched in it to permit nailing to ramp and car floors.

Pugh used the old plate but he added two angle irons fastened to the bottom. Through these he ran a locking bar chamfered on the ends to fit evenly against the sides of the car and the apron. He set a D-handle section in the center of the plate and welded it to the locking rod in such a position that when the D-handle is placed flat, the lugs on the rod are locked to hold it firmly in place. There is no possibility of slippage.

The D-handle can be raised to take the forks of a lift truck and permit easy movement from place to place in less than three minutes by the forklift operator alone as compared to 10 minutes and three men required for moving the old type.

Pugh, chief of the inspection branch of port equipment division, was one of eight employees receiving awards.

want to move it for profit?
move it with KENNETT!



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SUPER STRENGTH—Start with National's famous hard vulcanized fibre. This is the magic material with a happy combination of extreme toughness—great mechanical strength—smooth hard surface—yet with a shock-absorption quality that protects delicate parts.

EXPERTLY FABRICATED—Add all-riveted construction with reinforced metal hardware plus smooth plated metal molding for the finest industrial receptacles you can buy!

LIGHT-IN-WEIGHT—With all its strength, Kennett equipment is light in weight. Ounce for ounce, National's hard vulcanized fibre is approximately half the weight of aluminum. When you move materials with Kennett, the weight is in the load—not in the container.

ECONOMICAL—Kennett Receptacles are the most economical you can buy! Here's why. They accept repeated shock without failure. They resist wear and abrasion. They won't splinter, dent, rust, or corrode. Kennett equipment will give you many years of long hard service without replacement or maintenance.

IMMEDIATELY AVAILABLE—Kennett equipment is now warehoused in California for immediate deliveries at lower costs than ever before.

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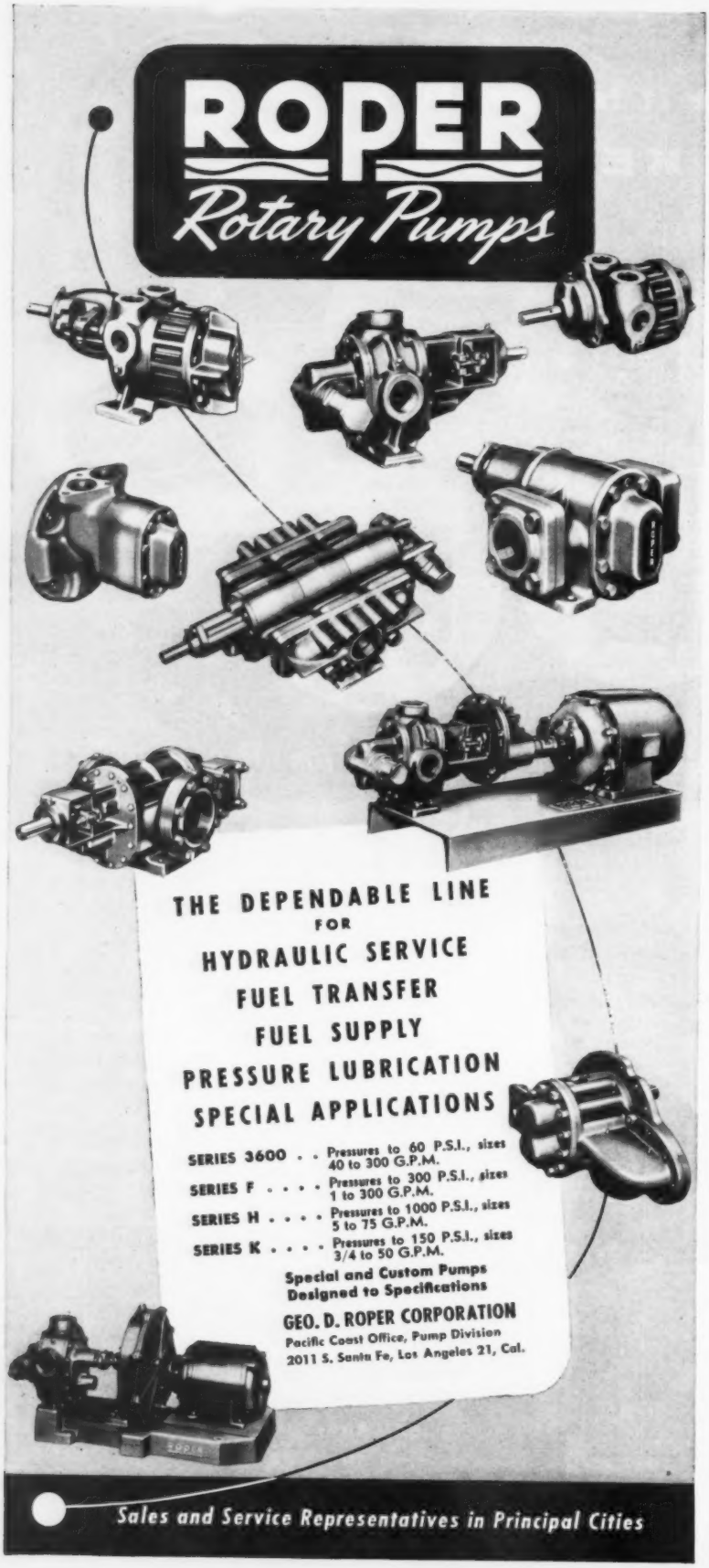
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WORLD PLASTICS FAIR in Los Angeles

WHAT the world of tomorrow will be like in terms of plastics will be revealed at the World Plastics Fair and Trade Exposition to be held at the National Guard Armory in Los Angeles, Calif., April 6-10, 1955.

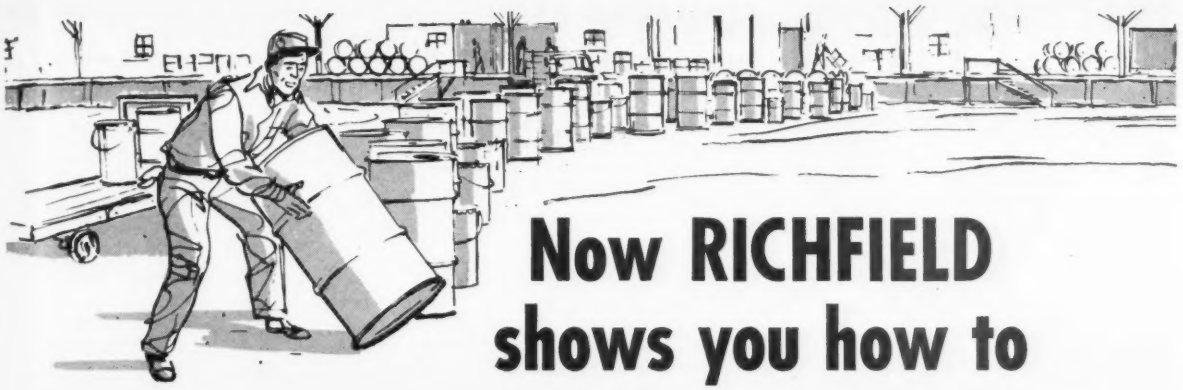
Industrial products, furniture, interior and graphic arts designers, engineers, plastics material manufacturers, and companies who process and fabricate all types of plastic products are invited to submit samples of their work for inclusion in the special exhibit. For information write to the Fair Management, 8762 Holloway Drive, Los Angeles 46.

GAS TURBINE lubrication problems

EXTREMELY HIGH operating speeds of small ram air and gas turbines have opened up an entirely new field of bearing and lubrication problems. Marquardt Aircraft Co., Van Nuys, Calif., has found that micarta ball retainers are superior to metal for extremely high speeds, but when high temperatures are involved, metallic—preferably silver-coated—ball retainers are superior.

It is essential that lubricants have an operating temperature range from minus 65 deg. F. to plus 450 deg. F. if they are to meet the demands of today's aircraft. In ram air applications, the company uses two types of lubrication. For units of short life or duration, where plain bearings and gear box are not present, grease lubrication is employed. In units with plain bearings and gear box, a loss system or recirculating system is used, depending on operational time.

Of all the major components of the air turbine drive, the gear box has provided the fewest complications. Most of the problems in this area have been associated with lubrication. In one instance, a wet sump splash type of lubrication system was tried in the hope of saving weight by eliminating lubrication pumps, coolers, and attendant plumbing. Tests proved, however, that the gear box was extremely sensitive to the quantity of oil in the box—too much, and the unit overheated; too little, and planet needle bearings failed from starvation. The system was abandoned in favor of a dry sump pressure lubrication system with planet gears mounted on plain bearings.



Now RICHFIELD shows you how to

REDUCE YOUR OIL INVENTORY

WITHOUT SACRIFICING LUBRICANT QUALITY

Many plants regularly stock more types and grades of oil than are really necessary for adequate lubrication.

The cost of this can be measured by money invested in a large inventory of specialized oils, additional work for your purchasing department and the increased chance for error by lubrication with the wrong oil – to say nothing of the storage space required.

HERE'S THE ANSWER...

Many large oil inventories have been materially reduced by the versatility of Richfield Eagle Oil R & O (rust and oxidation protected). In several grades, this remarkable oil does such diverse jobs as lubricating steam turbines, high-speed gear units, journals and air compressors. And it is the ideal hydraulic fluid!

SEEING IS BELIEVING

Ask your Richfield representative to show you how Richfield Eagle Oil R & O can actually improve lubrication, guard machinery against rust, *and reduce your oil inventory at the same time!* Why not call him now?

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SUBMARINE CABLE laying machine

WESTERN GEAR Co.'s Seattle plant has received a U. S. Navy commendation for its role in conceiving, designing, and building a revolutionary oceanic submarine cable laying machine.

The job requirements were as follows:

1. Design, build, and supervise the installation of a cable laying machine capable of handling unusually large diameter cable under ultra-high tensions at varying speeds, adhering to a strict time-schedule.

2. The drive had to be automatically sensitive to minute variations in tension and automatically adjusted in order to provide sensitive control of of the cable.

3. Provisions had to be made to absorb the power generated by the weight of the cable being lowered to the ocean floor.

4. Brakes had to be provided capable of holding maximum loads carried by the cable drums and emergency brakes for stopping the cable in case control was lost at the cable machine.

5. Equipment had to be provided for carrying the cable forward and over the bow of the ship.

The main part of the machinery is a cable winch and two sealed cable drums 4 ft. wide and 16 ft. in diameter, with bull gears of the same size. Cable is stored in deep tanks in the hold of the ship and payed out after three or four turns around the drums, and then onto the ocean floor. A control console is the brain of the entire electrical system and provides for remote touch control of the cable machine. Automatic tension machines were installed forward of each main drum on the ship to measure the amount of tension in the cable at all times. They are electrically tied into the drive system to control and vary the speed of the main cable machine.

3-D MAGNIFICATION
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Requires less skill

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Makes little parts look big!

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Machine Tools Cutting Tools Measuring Instruments
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The DoALL Company, Des Plaines, Ill.

CANNERY WASTE disposal solution

A SOLUTION to the problem of disposing of cannery wastes has been successfully tested by engineers of the sanitary engineering section of the Division of Industrial Research at Washington Stage College, Pullman. Liquid wastes were applied to small plots of grass and alfalfa at a cannery in Dayton, Wash., and the effects of the application on the vegetation were observed. Blancher wastes alone caused injury when applied undiluted, but up to 4 in. of total plant effluent could be applied every 4 days without damage, actually with some fertilizing effects. This method of disposal avoids stream pollution, provides satisfactory disposal of the waste, and provides irrigation water and some fertilizer for farms in the immediate area.

LP-GAS SALES in the West

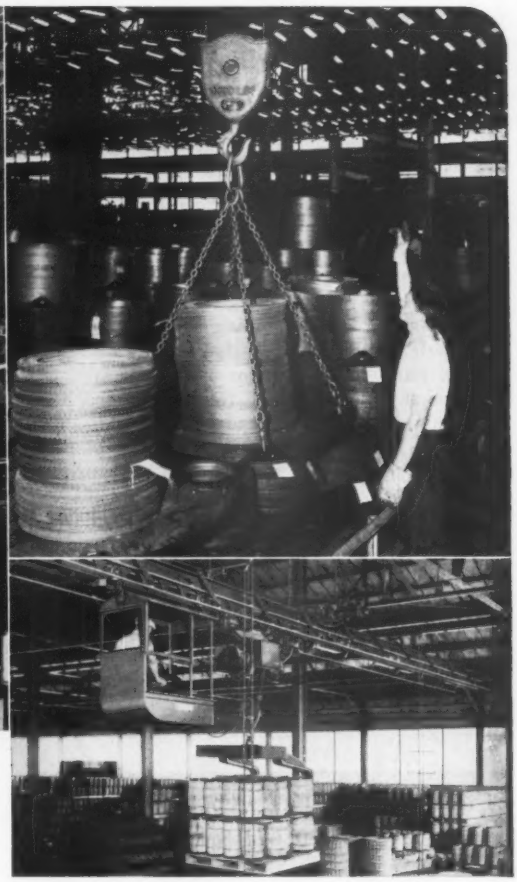
(thousands of gallons) from Bureau of Mines

	1952	1953
Domestic and commercial		
PAW Dist. 4 (Colo., Idaho, Mont., Utah, Wyo.)	87,061	95,855
PAW Dist. 5 (Ariz., Calif., Nev., Ore., Wash.)	238,590	247,489
Gas manufacturing		
Dist. 4	4,168	4,128
Dist. 5	35,038	26,473
Industrial		
Dist. 4	3,556	4,576
Dist. 5	20,915	12,623
Synthetic rubber		
Dist. 5	31,951	37,104
Chemical		
Dist. 4	27	.....
Dist. 5	50,864	47,354
Internal combustion		
Dist. 4	11,234	15,478
Dist. 5	66,125	74,790
Total (incl. other uses)		
Dist. 4	106,352	120,428
Dist. 5	446,247	448,341

CRANES *SPEED* PALLET-HANDLING

Store More—Eliminate Congestion—Cut Maintenance—Save Floors

Pallets loaded with motor stator laminations are easily lifted and moved with these floor-operated Tramrail cranes. Note that the entire area is jam-packed, with no lost aisle-way space. The ease with which any loaded pallet can be picked up and handled to awkward-to-reach places is a distinct advantage.



Pallets with 32 100-lb. kegs of nails are piled high in storage with the cab-operated Tramrail crane and open-side pallet lift.

THERE'S no height limit when stacking palleted materials with Tramrail cranes. 20 ft.—30 ft.—40 ft. or higher are easy. Your materials and building are the only limiting factors.

Often 50% and more materials on pallets can be stored in a room served by overhead cranes. Narrowing of some aisles, elimination of others, plus higher and closer piling make the difference.

Pallet loads are moved safely and speedily overhead where the path is always clear and unobstructed. Placing this handling job near the ceiling, reduces floor congestion and frees much of it for other purposes.

Maintenance costs for Tramrail cranes are extremely low, usually only a few percent of that for power-operated floor trucks. No engines to overhaul. No clutches to replace. No brakes to re-line. No batteries to charge. No irritating gas fumes. And of importance, extra heavily reinforced floors are not required and costly floor damage because of materials handling is eliminated.

When considering pallet handling or any materials handling, it will pay you to look into the tremendous advantages that Cleveland Tramrail cranes offer.

GET THIS BOOK!

BOOKLET No. 2008. Packed with valuable information. Profusely illustrated. Write for free copy

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THE CLEVELAND CRANE & ENGINEERING CO.
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OVERHEAD MATERIALS HANDLING EQUIPMENT

NEW MARKETS expand pump demand

DEMAND for pumps is growing from many sources: well drilling to increase municipal water supply; government flood control; increasing industrial application; atomic energy development; and the increase in domestic water consumption per capita.

Apparent tendency in recent years in industrial applications has been to use vertical pumps for services that heretofore have been done exclusively by horizontal centrifugal pumps. In addition to the normal usage of the vertical pump for developing water from underground sources, that same type of pump is now being used in chemical industries and oil refineries for pumping various types of viscous liquids at high pressures and above normal temperatures.

Alloy pumps

Many vertical pumps are now made of stainless steel or other alloy metals, thus making the vertical unit adaptable to a very wide variety of industrial services.

Another recent development has been the use of vertical turbine pumps of extremely deep settings to repressure oil fields. Many of these installations are 1,000 ft. in depth and some have been installed as much as 1,200 ft. in depth. These units are expensive and fulfill a hazardous service, but because the results are profitable the oil companies will continue that process.

Export

There is an ever-increasing demand for vertical pumps in foreign lands for bringing water from the underground supply to the surface. However, this market will not provide a great increase in volume for our domestic factories. Many of these foreign lands are building tariff structures which virtually prohibit the importation of vertical pumps from the United States. This has resulted in many of the American manufacturers establishing manufacturing plants in foreign lands. In most of these lands pumps can be made for considerably less money because of the lower labor costs.

There is also developing some German competition that makes it almost impossible to sell American-made pumps in competition with these European products. This is also true of horizontal centrifugal pumps.

PROCESSING LAB for sugar beets

THE Beet Sugar Development Foundation, an organization of all beet sugar manufacturers in the United States and Canada, has provided $45,000 for the construction of a small-scale sugar-beet processing unit in the Western Regional Research Laboratory in Albany, Calif., which is expected to be ready for operation on 1955 crop beets.

Since 1948, when this group was organized as part of the Laboratory's Field Crops Section, it has determined the composition of beet juices and changes they undergo during processing and has developed analytical methods necessary for such studies. Completed work has been reviewed annually by a technical committee of the Foundation, and the results have been made immediately available to technologists through this committee. P. B. Smith, General Agriculturist of Great Western Sugar Co., Fort Collins, Colo., is president of the Foundation and James Fischer is secretary.

Beet sugar manufacturers have long realized the need for a laboratory processing unit.

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COMPUTER CONFERENCE in Los Angeles

THE JOINT WESTERN Computer Conference and Exhibit will be held at the Statler Hotel, Los Angeles, Calif., on March 1, 2, and 3, 1955, sponsored by the I.R.E., A.I.E.E., and Association for Computing Machinery. Preregistration fee is $2.50 and covers admittance to lectures and exhibits and a copy of the Transactions.

Motif of the Conference is functions and techniques in analog and digital computers. Technical papers and discussions will include descriptions of existing systems and techniques, methods of matching digital tapes and cards, language and communication problems between machines, the possibilities of managerial and computer systems revision to achieve rapid and lasting marriage, and new developments in analog computers and analog computing methods.

INDUSTRIAL HEATERS hit peak in 1954

DEMAND IN THE WEST for industrial unit heaters for the year 1954 was the largest in history. Demand increased 73% in the period 1948-1954. This is an average of 12% per year for shipments to the 11 Western states. The national market increased 48% in the six-year period, showing the West's increase to be 25% ahead of the nation as a whole.

Industrial unit heater shipments into the West

	% shipments in entire U.S.
1948	5.8
1949	8.4
1950	8.8
1951	8.2
1952	9.4
1953	9.1
1954 (6 mos.)	10.1

The Convector Manufacturers Assoc. indicates that its members have increased shipments to the 11 Western states from 7.9% in 1952 to 8.2% in 1953.

The newest development in the heating industry is baseboard heating, while the newest development in the plumbing industry is the vanity lavatory.

The pacesetter of accelerated activity in the plumbing and heating industries, as well as in most other lines of business, has been the continuing boom in construction of all types.

There is also the huge market in remodeling and modernization.

how Maas HYPO improves these industrial processes

And perhaps one of the many Maas chemicals can help improve your product or process. Write today for folder describing the Maas line.

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Maas Hypo is found to be a most economical means of separating starch from gluten in flour.

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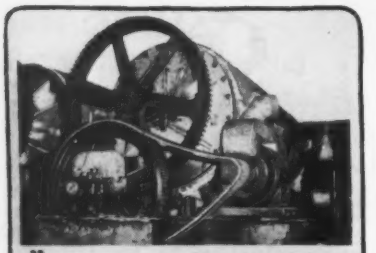

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LUBRICATING TIPS for plug valves

PLUG VALVES are popular because of their simple construction, quarter-turn closure, tight seal, and ease of operation. To get maximum service out of these versatile valves, T. H. M. Taylor, chief engineer of Rockwell Manufacturing Co.'s Nordstrom Valve Division in Oakland, Calif., offers the following tips on plug valve servicing:

1. Plug adjustments should be snug—tight enough to keep the plug from becoming unseated, but not to a degree requiring excessive force to operate the valve.

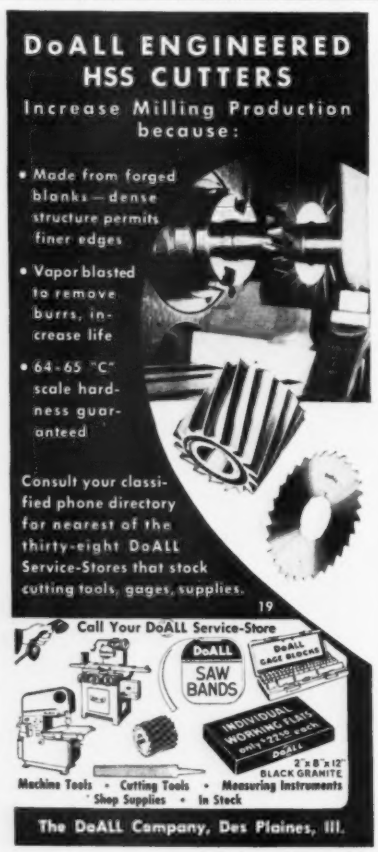
2. Lubrication should be periodic, systematic, and with the proper grade of lubricant.

3. Fresh supply of lubricant can be easily forced between the seating surfaces by giving the lubricant screws a few turns. But be sure to keep the valve lubricant system filled.

4. Depletion of lubricant in the valve lubrication system will require the addition of several sticks before lubricant can be forced into the seat. Lubricant should be added until increased resistance is felt in turning the lubricant screw, or until there is increased pressure when gun lubrication is used.

5. Turn the plug slightly when lubricating to assist in the distribution of lubricant and to determine if the adjustment is correct. If the valve is lubricated with the adjustment too loose, efficient lubrication cannot be obtained.

Further, the valve may be permanently unseated allowing the lubricant to quickly dissipate, and the valve may leak. If the valves are overlubricated with the adjustment too loose, this can be corrected by alternately tightening the adjustment and turning the plug. This will work out the excess lubricant and permit the plug to return to its proper position in the seat.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Shop Supplies • In Stock
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TOOLS AND DIES slow last year

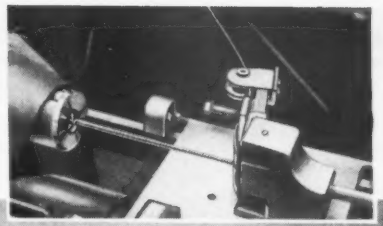
THE PAST YEAR was one of steadily declining business in the tool and die industry. Cutbacks in government orders caused most of the larger companies to curtail their outside production activities. In many cases they canceled contracts with smaller shops, pulling the work back into their own plants in an effort to maintain or, in some instances, increase their own volume of work.

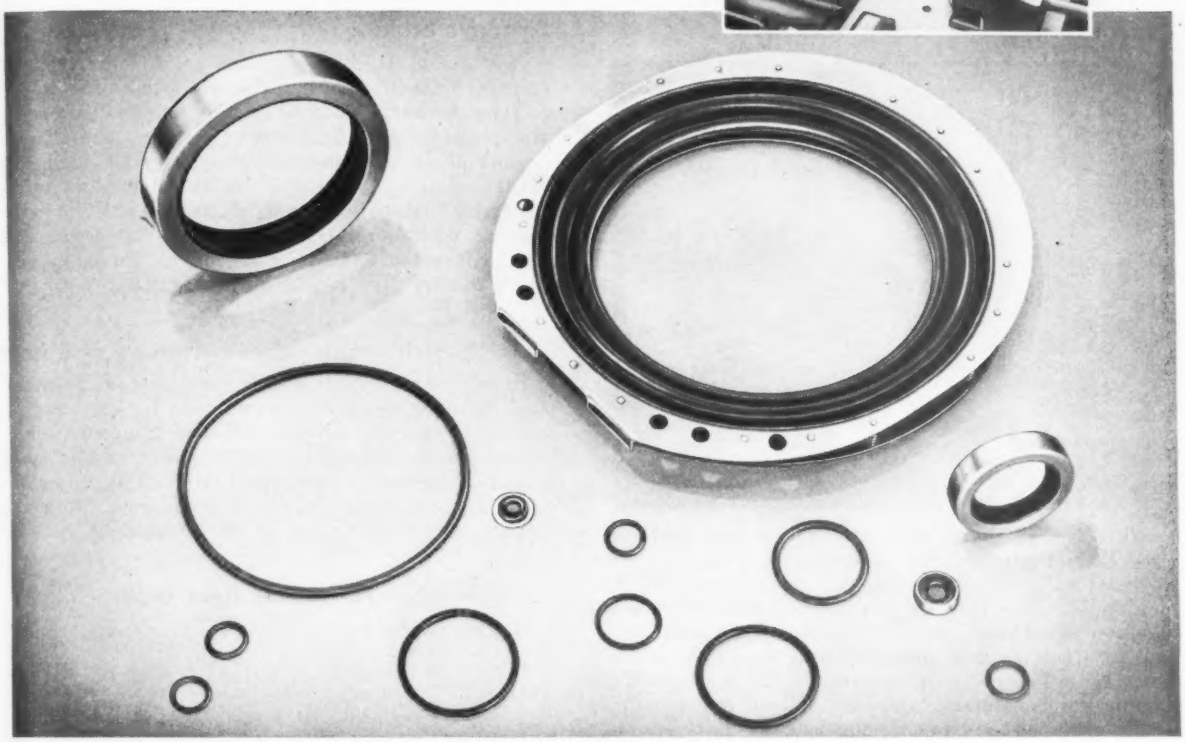
Southern California Tool and Die Assoc., which now has a membership of over 80, reports tool and die makers in Southern California responded to the peak demands of Western industry but now need more work to help them through the low spots until they are again needed for another peak.

As industry moved West, tooling was purchased in the East at first. But as Western toolmakers expanded and as Eastern concerns established new toolmaking plants here, demands of Western industry were met in the West. When World War II came, there was a great expansion of tool and die making facilities to meet extraordinary demands. When the Korean War came, there was another expansion to meet stepped-up delivery, tolerance, and quality requirements.

Southern California tool and die men continued their growth until now they work for industries up and down the Coast and in the central states. Due to their tremendous growth in the last decade, they have the most modern and up-to-date equipment, enabling them to perform the highest precision work with the utmost efficiency.

Winding a coiled spring is done on a small mandral by this machine. Later, the spring is cut to length and assembled on another machine which, like the one pictured, was designed by engineers of National Motor Bearing Company, Inc., Redwood City, California.





A sampling of the 5000 standard oil seals and springs manufactured by National is shown above. An integral part of many of these oil seals are close-wound helical springs—made from select USS Manufacturers Wire.

Special wire assures "uniform tension" in oil seals

Among the different type oil seals made by National Motor Bearing is a revolutionary new one—part of a lubricating system designed to eliminate practically all hot boxes from railroad cars. An important part of this new seal (shown above, upper right) is a coiled spring. To achieve proper tension these springs must be formed from wire that has *uniform tensile* properties. Metallurgists at United States Steel *tailor-made* a wire to fit National Motor Bearing's particular requirements. The company's engineers report that the USS wire "completely fills our needs".

With the greatest wire-making facilities in the West, Columbia-Geneva can supply more than 1,000 types, grades and finishes of USS Manufacturers Wire. For information and technical assistance, write: Columbia-Geneva Steel Division, 1403 Russ Building, San Francisco 6, California.

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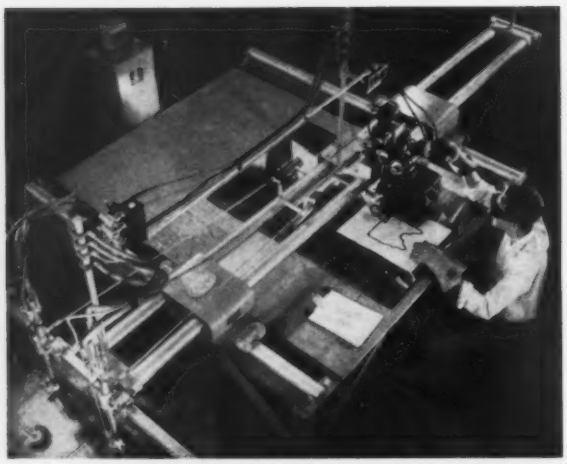
UNITED STATES STEEL

NEW EQUIPMENT AND MATERIALS

FOR YOUR CONVENIENCE the company address follows each item.

New oxyacetylene cutting machine



Airco No. 48 Duograph is a rectilinear-type, medium area, shape cutting machine with four torch capacity, introduced at National Metal Congress last November. With one tracing table, machine can cut four 48-in. diameter circles simultaneously, using two torches at each end. Each additional tracing table extends cutting length 80 in. All controls are grouped near the operator for automatically lighting torches, turning gases off and on individually, tracer operation, and raising and lowering torches. *Air Reduction Pacific Co., 220 Bush St., San Francisco*

Pneumatic temperature control

Powers Limitem is a differential expansion-type control designed for precision regulation of heating, cooling, ventilating, air conditioning, dew point control, and industrial processes. Temperature range is from 35 to 135 deg. F. Sensitivity can be adjusted from ⅛ to 2 psi. per degree of temperature change. *Power Regulator Co., Dept. WIS, Skokie, Ill.*

Silicone release agent

Dow Corning's new mold release emulsion 36 has unusually high resistance to creaming or separation. After 30 min. in a high speed centrifuge, tests show it separates less than 2% and is easily reconsolidated by gentle agitation. It will not break even after eight freezing and thawing cycles. Free samples available. *Dow Corning Corp., Midland, Mich.*

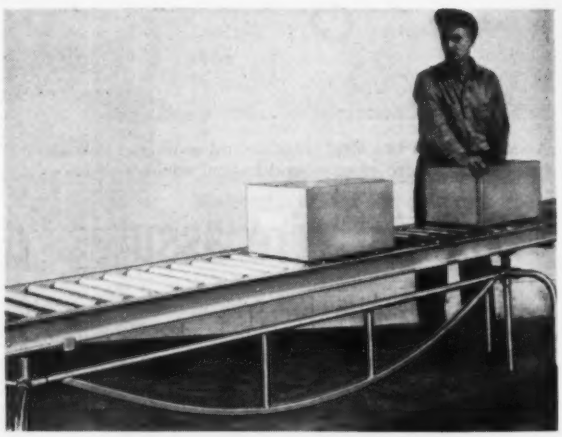
Dynamic braking

New type of AC dynamic brake motor is now available up to 30 hp., built right into standard frame size single or polyphase induction motors. Braking action is a two-stage process: (1) Single-phase current is superimposed on excitation phase of multi-polar brake winding, producing dynamic braking torque down to its synchronous speed. (2) Rotor feeds power into short-circuited phase of brake winding, continuing braking action down to zero speed. Braking is smooth and continuous, providing a rolling stop. *Master Electric Co., 126-42 Davis Ave., Dayton, Ohio.*

New "Scotch" tape defies chemicals and heat

Tape No. 549, made from a DuPont resin, is a pressure-sensitive semi-transparent tape designed for easy application as a protective covering material. Suggested applications are on food processing equipment and on small rollers for chemical protection and anti-sticking properties. Available in ½- to 5-in. widths on 36-yd. rolls. *Minnesota Mining and Manufacturing Co., 900 Fauquier St., St. Paul*

Portable conveyor makes light work



New all-magnesium portable conveyor units can be installed as a complete system or supplied in individual sections, with couplers to match existing systems, for conveyor job spotting in plants and warehouses. Conveyor can be set up or dismantled by one man. Available in two capacities: 500 and 900 lb. Roller sizes range from 12 to 20 in. *Magline Inc., Pinconning, Mich.*

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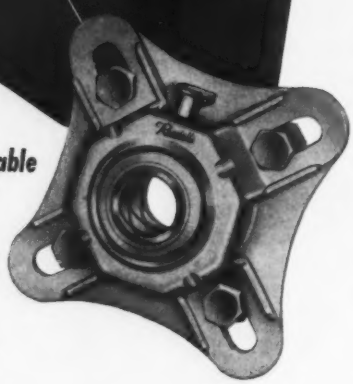
543 DEPT. 140

NEW Randall LOW COST 4-BOLT FLANGE UNIT



- *Easily Interchangeable*
- *Double Lubricated*
- *Self-Aligning*
- *Self-Lubricating*
- *Easy to Install*
- *Long Trouble-Free Service*

Randall's new 4-bolt flange is readily interchangeable with any unit having bolt hole centers from 2⅛" to 2¼". It's ideal for heavy duty application on farm implements, conveyors, textile machinery, air moving equipment, packaging machinery and other similar type equipment.

*

This new, low-cost, four-bolt flange pillow block has all the outstanding features synonymous with Randall bearings. It features the famous, exclusive Randall "deep well"® ball assembly which offers a unique double lubricating principle combining Randall's exclusive graphited bearings with grease or oil type lubricants. This assures controlled lubrication for long trouble-free operation.

Compact and light weight, the Randall 4-bolt flange is designed with slotted bolt holes which permit fast assembly and easy interchangeability. Units are shipped assembled as one piece to assure easy handling and installation. Complete information is yours for the asking—Write today!

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PILLOW BLOCKS
SHEET LUBRICATOR

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THRUST WASHERS
SAFETY COLLARS
BRONZE CASTING

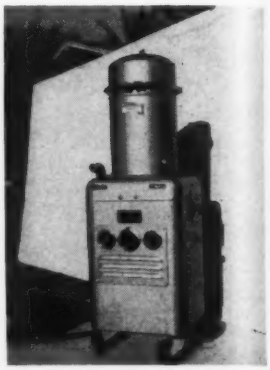
RANDALL GRAPHITE BEARINGS, INC.

1011 S. GREENLAWN AVENUE, LIMA, OHIO

NEW EQUIPMENT

. . . Begins on page 70.

Portable oil reclaimer



Here is equipment which reconditions all types of industrial oils and solvents, while in service or out of service, by removing and rendering harmless solids of every kind—suspended solids from oil deterioration due to heat oxidation, gums, varnishes, acids, water, and emulsions. It can also be used for purging and cleaning oil lines and galleys, as a transfer pump for moving liquids from barrels to reservoirs, etc., and as a liquid circulating pump to pre-heat oils. *Mayhew Products Co., 2423 E. 57th St., Los Angeles 58.*

For protecting vise jaws

New device, a set of aluminum plates which can be attached to vise jaws and are held in place by tempered spring clamps, quickly converts a regular bench vise into a vise for wood or highly finished metal parts. Using plates, soft work pieces may be held in vise without damage. Gripping surfaces can be kept in good condition with ordinary sand paper. *Robbins Manufacturing Co., Dept. 81, 1240 S. Prairie Ave., Hawthorne, Calif.*

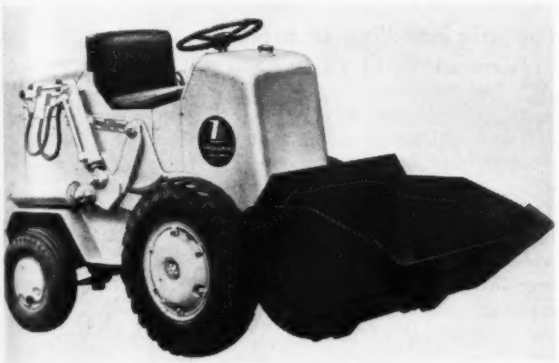
Speed drive lathe with back gear shift

Rockwell's first metalworking lathe features a patented back gear shift lever—a new development which eliminates need for using wrenches, pulling out pins, or opening guards to shift from direct spindle drive to back gear spindle drive, loose or locked spindle. Machine has vari-speed drive offering speed range from 44 to 1,550 rpm. Speeds can be changed without turning off machine. *Delta Power Tool Division, Rockwell Manufacturing Co., 438 N. Lexington Ave., Pittsburgh 8, Pa.*

"All-weather" cab for Buda trucks

Here's the ticket for efficient operation of fork lift trucks regardless of weather conditions. New cab is designed for Buda Models FTP60-24 (gasoline) and FTPD60 (diesel) 6,000-lb. capacity fork lift trucks. Features include full driver visibility, safety glass, adjustable door windows, entry from either side of cab, and heater and defrosters (optional equipment). *Buda Co., Division of Allis-Chalmers Manufacturing Co., Harvey, Ill.*

New model HA Payloader



Bucket capacity has been increased to 18 cu. ft., with a struck-load capacity of 14 cu. ft., on the new HA model Payloader. Productive capacity has been increased from 50 to 100 per cent over previous model and maximum dumping height upped 18 per cent. Different bucket arm design permits 40 degrees of tipback and carrying of heaped loads at lower level. Hydraulic accumulator minimizes load shocks and stabilizes controls. Torque converter drive and full-reversing transmission are featured. *Frank G. Hough Co., 889 Seventh St., Libertyville, Ill.*

Westinghouse lightning arrester

Improved station-type lightning arrester contains new safety pressure-relief device. Addition of exhaust ports on Westinghouse arrester makes possible removal of source of gas-generation, should arrester lose ability to limit or interrupt powerflow. Arc is transferred to outside of porcelain housing within ½ cycle or less of fault current, preventing rupture of housing by arc-generated gases. SV station arrester line is applicable on voltages from 3 to 330 kv. *Westinghouse Eletcric Corp., Box 2099, Pittsburgh 30, Pa.*

Additions to grating line

Four new designs of aluminum grating by Blaw-Knox include rectangular, diagonal, super safety, and radial. Rectangular, for ordinary uses, can have openings from ¾ to 6 in. with cross bar spacing from ¾ to 8 in. Interlocked super safety has 3/16 in. bearing bars spaced 1 or 1⅛ in. apart and cross bars 2 in. apart. Diagonal grating also has 3/16 in. bearing bars and same spacing. Radial grating is made to size. *Blaw-Knox Co., Farmers Bank Bldg., Pittsburgh, Pa.*

Dual purpose stacker

For operations requiring both platform and forks, this Lewis-Shepard stacker is equipped with 30 in. forks which handle 30 by 30 in. pallets or 30 by 40 in. platform slipped over forks. Lifting speed is 25 ft. per minute with a 1,000 lb. load. Storage battery, which charges from any lighting circuit, powers the stacker. It is controlled by a single lever. *Lewis-Shepard Products Inc., Watertown, Mass.*

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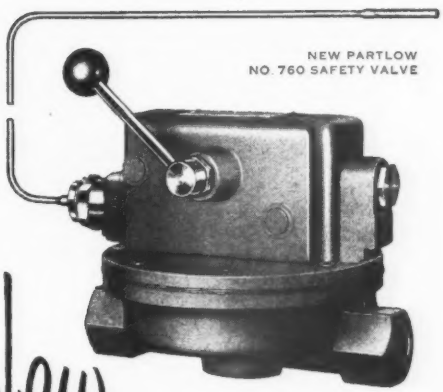

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explosion-proof
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First TO PROVIDE COMPLETE SAFETY FROM GAS PILOT FAILURE

First TO END COSTLY GAS LOSS ONCE AND FOR ALL

Shuts off entire gas supply seconds after pilot failure. Mercury actuated and entirely mechanical — no electric current. Simple, rugged, foolproof — no slip stem to corrode and stick. Pipe sizes — ¾" or 1". Mounting brackets to fit all oil industry applications.

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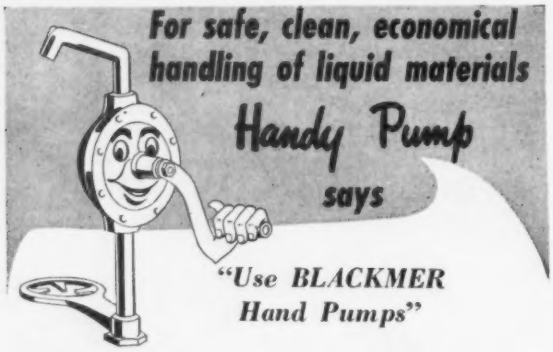
•Tinius Olsen Testing Machine Co.
•Wilson Mechanical Instrument, and Helicoid Gage Divisions of American Chain & Cable Co.



Check these features!

- Easy rotary pumping action.
- Surplus liquid return eliminates spillage and waste.
- Positive displacement for positive control.
- Wide range of "plant engineered" accessories.
- Available in capacities from 7 to 28 gallons per minute.

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Here are *some* of the reasons this new heavy duty model offers you more per truck dollar invested:

LOW OPERATING COSTS—electric power costs only pennies per day. No fumes. No vulnerable clutch.

EASIER MAINTENANCE—all parts instantly accessible for faster lubrication or inspection.

COMPACT—97″ overall length (less forks). 83″ high uprights provide 110″ lift on standard model.

EASY STEERING due to articulating caster-type trailing axle. 61″ wheelbase. Turns in 83″ intersecting aisles with 42″ forks.

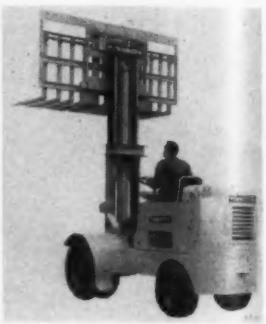
SEND FOR FULL DATA on this new model.

ELWELL-PARKER ELECTRIC CO. WESTERN REPRESENTATIVES:
Los Angeles . . . J. W. LAFFERTY CO., 5422 E. Washington Boulevard
San Francisco . . . . . IRA G. PERIN CO., 575 Howard Street
Seattle . . . . . COLBY STEEL & MFG. INC., 3155 Elliott Avenue

NEW EQUIPMENT

. . . Begins on page 70.

For safe handling of blocks



Towmotor Model LT-60 plus block-handling accessory, dual drive wheels, and side shifter is recommended for speedy handling of cubes of block. Twelve individual forks are mounted on a special extra-wide carriage. Side shifter accessory results in accurate alignment of forks without repositioning truck itself. Dual drive wheels assure traction, increased flotation over uneven terrain, and greater stability in stacking. *Towmotor Corp., 1226 E. 152nd St., Cleveland 10, Ohio*

Sweeper may be pushed by hand or towed by vehicle

Shrader PFH sweeper, available in widths of 48 and 60 in., is a new type of permanent magnet sweeper for removing nails, wire, and other ferrous metal from large areas. Shift of lever discharges collection of metal. Designed for extra heavy duty, sweeper is light enough to be pushed by hand. *F. W. Shrader Co., 5788 W. Washington Blvd., Culver City, Calif.*

First of its kind

First all-molded plastic valves and fittings, designed and engineered by Lunkenheimer Co., are claimed to have remarkable resistance to corrosive chemical action. Base material used for new Luncor valve is polyvinyl chloride (PVC), already used in corrosion-resistant piping. Molded in rigid form, it is suitable for pressures up to 125 lb. and 150 deg. temperature. Valve is now available in Y-type globe design. *Lunkenheimer Co., Cincinnati 14, Ohio*

Industrial and Protective Coatings

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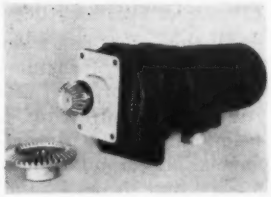
Especially formulated to protect metal, wood, concrete—submerged or not; acid and alkali resistant. Colors available. *Full free details, write for:* **Folder 575, Dept. 8.**

An Inertol Product

INERTOL CO., Inc.
27 So. Park, San Francisco 7

New rotary actuator



This actuator can be rotated 330 deg., plus or minus 2 deg. in either direction. It is a .7 hp. unit, 200 v., 400 cycle, 3 phase. Locked rotor torque is 12 lb., with 11,200 rpm. input and 38 rpm. output, 7 amps. continuous duty. *Western Gear Works, Box 182, Lynwood, Calif.*

For painting flatware

New rotary spray painting unit has four rotating arms mounted on revolving vertical spindle. Automatic spray gun is mounted on each of the four arms. Guns travel in a circular path above a conveyor and are in operation only when they are directly over flatware to be painted. Machine can apply coatings at high conveyor speeds, reportedly as fast as 100 ft. per minute. Depth of finish is controlled by varying the speed of rotary head. Also available as a conversion unit. *Binks Manufacturing Co., 3122 Carroll Ave., Chicago 12*

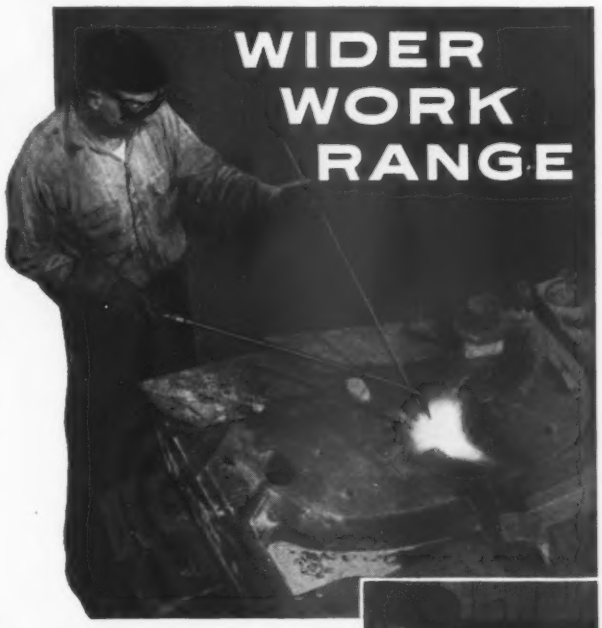
Automatic bin loader

Here's a device which loads stacks of steel sheets and lumber, bundles of pipe, rod, bar stock, and tubed rugs, in stationary bins at any height above floor level. Load of up to 10,000 lb. is positioned on platform, picked up by either crane or fork truck, and raised vertically to required bin. Unit locks by quick-attachment device to front of bin; operator presses pushbutton; and entire load is moved into bin. *Beacon Machinery, Inc., Box 188, East St. Louis, Ill.*

New injection molding machine

New design 16-oz. horizontal plastics injection molding machine, Model 16ES-400, is immediately available ready for operation except for oil and dies. Fully hydraulic polystyrene rated press has a 16-oz. shot capacity and 400 ton clamping force. Important features are radial piston type motor driven pumping unit, semi-automatic control, rapid operating speed, independent control of injection and clamping pressures, shots of greater than rated machine capacity by means of stuffer feature, internally heated torpedo type heating cylinder with four zone temperature control and plasticizing rate of 150 lbs. of polystyrene per hour. Mold area dimensions are 34-in. opening, 22-in. stroke and 20 by 36 in. or 21 by 33 in. die space. *Watson-Stillman Co., Roselle, N. J.*

The man on the job likes Victor's



Using a VICTOR No. 310 torch butt with two S2 extensions and No. 8 type 4 tip, Joe Wyman (Shreve Welding Co., Oakland, Calif.) repairs cast iron heating boiler header with VICTOR No. 1 low fuming manganese bronze rod. Inset photo shows 5/64" build-up on undersize castings, done with same No. 310 torch but with No. 5 type 4 nozzle and VICTOR No. 6 square cast iron rod.

VICTOR'S wider work range pays off from the day you select your first VICTOR welding outfit on through a lifetime of reliable service. You buy the torch you need for your present work, add extensions, cutting attachments or special nozzles as they're needed. Result: top-quality equipment that's always perfectly matched to your needs!

Whatever the job . . . welding, cutting, heating, brazing, descaling . . . you'll start it quicker, finish it sooner with versatile VICTOR equipment!

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- ☒ STENCILLED
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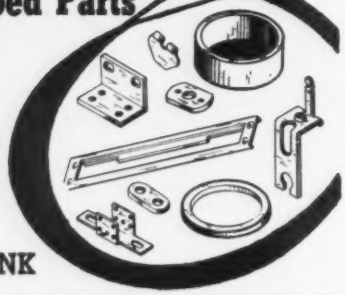

Years of tooling experience, combined with modern machines has proven over the past 20 years that the temporary die method is the most economical for model work and small production runs.

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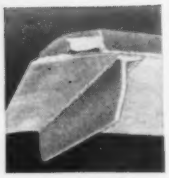
Look underneath to see another Magcoa feature that insures better performance, longer Dockboard life on your truck dock: the 7½-inch safety angle. It fits snug in the narrow gap which results when you back into the dock and set your brakes; no need to move truck or trailer a second time. Regardless of abuse, the Magcoa safety angle holds up, won't crush or break. Spindly channel sections and other fragile locking devices can't take this kind of rough treatment.

The whole story is told in a new bulletin, "Look Into *And Under* Magcoa Dockboards." Write today for your free copy.



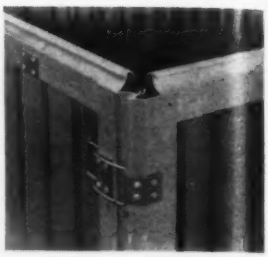
LOOK UNDERNEATH! You will see the ⅜"x7½" Magcoa safety angle. It extends the full width of the Dockboard and is welded on all 4 sides—in this case, 124 inches of continuous precision welding.

MAGNESIUM COMPANY OF AMERICA
MATERIALS HANDLING DIV. • EAST CHICAGO 17, IND.

NEW EQUIPMENT

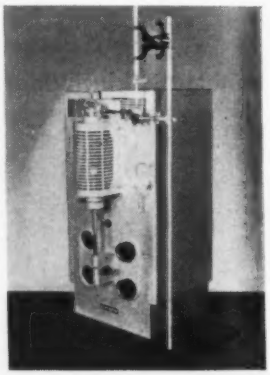
. . . Begins on page 70.

Featherweight pallet



All-aluminum pallet designed by Kaiser Aluminum & Chemical Corp. to meet Air Force requirements is being introduced to commercial air cargo operators for speeding plane loading and cutting down weight. Dimensions are 40 in. in width and height and 48 in. in length. Other characteristics are: indefinite reuseability, collapsible construction, four-way fork truck entry, and easy tie-down. At right is closeup of retaining clip, one of six securing top and sides of pallet, which can be collapsed in about one minute without tools. *Kaiser Aluminum & Chemical Corp., 9124 Broadway, Oakland 12, Calif.*

Laboratory combustion unit



New induction furnace for fast combustion of heavy and light hydrocarbons permits a complete sulphur determination in 15 to 20 minutes. All samples covered by ASTM bomb or lamp method can be completely combusted, and manufacturer states that samples show good agreement with data accumulated by bomb and lamp methods. *Lindberg Engineering Co., 2450 W. Hubbard St., Chicago 12*

Welding "brain"

Electronically-controlled Heliarc HWM-2 voltage control can guarantee strong and uniform fusion welds in mechanized inert gas shielded arc welding. This "electronic brain" maintains a constant arc voltage by governing distance of torch from work. In addition, it automatically turns on both torch cooling water and inert shielding gas at the start of weld and turns them off at the finish. Front-panel controls are set by operator, and from that point on operation is automatic. *Linde Air Products Co., 30 E. 42nd St., New York 17, N. Y.*

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New switch in conveyors

"Flex-A-Tail" is a conveyor unit designed primarily to speed and simplify order spotting on loading dock. A permanently floor-mounted roller conveyor has appended to it a portable mounted tail section of wheel or roller gravity conveyor which can be moved through an 80-deg. arc without use of conventional switching equipment. Floor-mounted conveyor receives goods from discharge end of a shipping room conveyor, and tail section extends onto loading dock, where goods it carries can be removed at any point and stacked for shipment. Tail sections up to 25 ft.; 5 ft. standard. *Metzgar Conveyor Co., 402 Douglas St., N.W., Grand Rapids 4, Mich.*

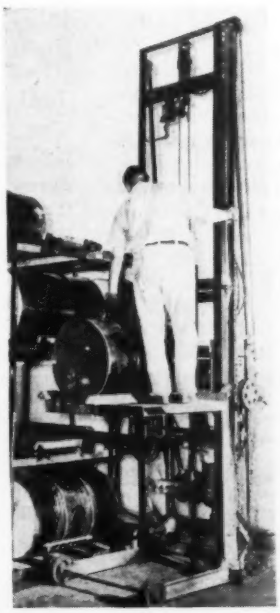
Automatic rebuilding

Mir-O-Col K-2M automatic rebuilding machine is versatile enough, manufacturer states, to handle practically any shape work. Cylindrical pieces up to 40 in. in diameter can be locked onto rotating shaft, or entire boom can be swung around to side for rebuilding on a stationary or rotating table. Engineered for ease of operation, K-2M has electrically-operated work shaft, power-controlled adjustment of welding boom, dial control of spindle speeds, and other automatic features. Machine utilizes submerged arc principle of automatic welding. *Mir-O-Col Alloy Co., Inc., 312 N. Avenue 21, Los Angeles 31.*

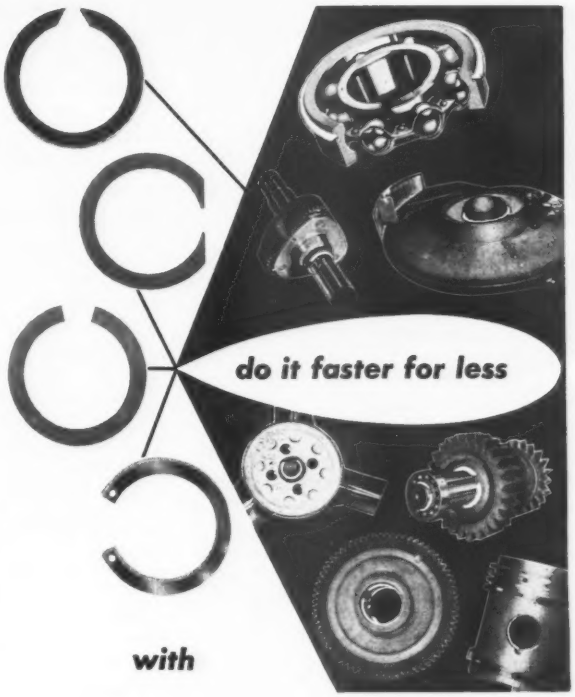
Speed Variator line

New line of Speed Variators, in sizes from ½ through 10 hp., is being produced. Features of this line include: compact unit with input and output shafts in line, output speed regulation from 1/3 to 3 times input speed, coaxial input and output shafts rotate in same direction. There is ample bearing support for both shafts to carry overhung pulleys, built-in torque-responsive mechanism and speed regulation by simple indicating manual adjustment or by manual or power remote controls. *Cleveland Worm and Gear Co., Speed Variator Division, 3269 E. 80th St., Cleveland 4, Ohio*

Explosion proof revolvator



Capacity of 1,000 lb., 12 ft. lift and 13 ft. 6 in. mast height are data on the new model NW explosion proof revolvator. Equipped with formica wheels, it has broken cable safety which prevents platform from dropping. Hoist unit with brake, overload controls and gear train are encased in an integral housing. All electrical fittings and controls are designed to be explosion proof. Revolvator Co. Distributed by: *Ira G. Perin, 575 Howard St., San Francisco*



RELIANCE SNAP RINGS

Immediate savings in production costs are made by switching from the old shoulder machining method to Reliance Snap Rings. The old method made it necessary to machine the entire length of an oversized shaft to form a shoulder. Now it can be done simply and easily by milling a groove and snapping in a Reliance Ring on a standard size shaft. Machining time, money and material are saved at no sacrifice in product quality or performance. Wherever you are mounting gears or bearings, consider the cost reducing features of Reliance Snap Bearing, Lock and Retainer Rings. You can't lose anything and may save a lot. Write for free Engineering Bulletin 4/K3.

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HELPFUL LITERATURE

FOR YOUR CONVENIENCE the company address follows each item.

Story behind one-man plant operation

A pulp bleach plant that is operated by one man from a "brain center" is one of the technological developments reported in the current quarterly issue of "Instrumentation." Other articles include a description of a walk-in test chamber that can artifically reproduce temperature, humidity, and altitude conditions found anywhere in the world and a "super-computer" used in development of new aircraft. *Minneapolis-Honeywell Regulator Co., Industrial Division, Wayne and Windrim Aves., Philadelphia 44, Pa.*

Cold roll forming info

. . . is given in "Your Guide to Cold Roll Forming," 16-page Caine Steel booklet which lists advantages for this relatively new process. Diagrams and photos show cold roll forming process and describe advantages of this method of metal working. *Caine Steel Co. of Calif., 2451 E. 23rd St., Los Angeles.*

1955 World Plastics Fair

A 40-page exhibitor handbook providing details of World Plastics Fair and Trade Exposition is available. Fair is to be held in Los Angeles, April 6-10, 1955. *Philip M. Kent, World Plastics Fair and Trade Exposition, Inc., 8762 Holloway Drive, Los Angeles 46*

Info on drill rods

A descriptive folder on high speed carbon and alloy steel drill rods is available. Data on grades, lengths, size ranges, finishes, and tolerances are included. *Allegheny Ludlum Steel Corp., 2020 Oliver Bldg., Pittsburgh 22, Pa.*

Truck tire test results

This illustrated booklet, TD-200, tells about a series of engineered tests performed on industrial solid tires. Large detailed "before" and "after" photographs illustrate tires used in specific tests. Booklet also contains several action photos of test equipment and procedures. *The Monarch Rubber Co., 280 Lincoln Park, Hartville, Ohio*

About fluid couplings

Bulletin No. 144-D offers complete installation and performance data on fluid couplings. Diagrams and drawings illustrate ease of application on any type of industrial equipment. Typical on-the-job applications are given along with dimensions and a general reference horsepower chart. *Twin Disc Clutch Co., Dept. DS, Racine, Wisc.*

All about gate valves

Bulletin 55G shows major stainless steel gate valves in Cooper Alloy line. In addition to schematic drawings of various valves, booklet includes section on design factors and a table of major stainless alloys, giving their designations and applications. *The Cooper Alloy Foundry Co., Hillside, N. J.*

Hydraulic motor info

Info on Dudco Dual-Vane fluid motors is contained in new 8-page brochure. Features, data on mountings, and specifications on hydraulic fluids for this motor, which operates at speeds up to 3,600 rpm. for 2,000 psi. continuous operation, are included. DM-301. *New York Air Brake Co., Dudco Division, 1700 E. Nine Mile Rd., Hazel Park, Mich.*

"Aluminum Bridge Railings"

. . . a 52-page manual, contains 100 illustrations and 27 tables covering expanded use of aluminum railngs in bridge construction. Brochure includes a study of architectural considerations, design details, and an analysis of typical bridge railings. Dimensions, weights, components, and guide specifications are given. *Reynolds Metal Co., 2500 S. Third St., Louisville, Ky.*

Safety equipment manual

This illustrated brochure presents complete easy-to-read technical data on all Bullard safety products. Equipment covered includes protective head gear, first aid unit packs, safety hooks, and respiratory equipment. Back page of catalog 55 lists addresses and phone numbers of Bullard distributors. *E. D. Bullard Co., 275 Eighth St., San Francisco 3*

Fiber catalog for West Coast

Special 8-page catalog for West Coast users of Kennett line of materials handling equipment serves as a guide to wide range of hard fiber trucks, boxes, trays, receptacles, and barrels used for a variety of purposes throughout industry. Included are complete descriptive info, illustrations, and stock size data. *National Vulcanized Fibre Co., Fibre Specialty Division, Wilmington 99, Del.*

Tool grinding specifications

This booklet provides extensive information on tool grinding procedures. General specifications and descriptions are given covering wide variety of shapes and sizes and diamond wheels for various needs. *Bay State Abrasive Products Co., Westboro, Mass.*

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Sanitary screening equipment

Screening equipment for efficient removal of solids from water, sewage, and industrial waste is described in a new 28-page brochure, No. 2587. Complete dimension and specification data for coarse and fine screens are included. Also given are tables to determine proper size unit for handling various capacities. *Link-Belt Co., Dept. 151, 307 N. Michigan Ave., Chicago 1*

Displays materials-handling equipment

This folder, "Heavy-Duty Weight and Tension-Indicating Instruments," pictures and describes complete line of hydraulic materials-handling equipment. Bulletin M-15 includes technical data on hook scales, tensiometers, crane weight indicators, and other items. *Martin-Decker Corp., 3431 Cherry Ave., Long Beach 7, Calif.*

Hydraulic cylinder, valve manual

Here's complete information on Modernair air and hydraulic cylinders, valves, and packaged units in this new full-line catalog. You'll find easy-to-use dimension drawings, installation, operating, and technical data on products, and up-to-date price lists. *Modernair Corporation, 400 Preda St., San Leandro, Calif.*

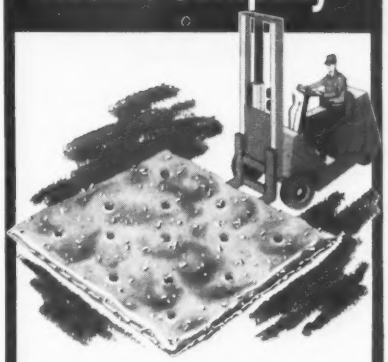
Portable heating unit

"Heat on Wheels," a six-page illustrated booklet, describes a portable heating unit claimed to save up to 75% on both equipment and fuel. Bulletin gives examples showing versatility of "Mortemp" heat machines and provides list of specifications. *Mortemp Division, Mechanical Products Mfg. Co., 1727 First Ave. South, Seattle 4*

How to select fiberglas panels

"What to Look For in a Good Translucent Building Panel" is a concise, easy-to-read guide on product standards for translucent fiberglas reinforced panels. Booklet shows how to quickly interpret numerous standards which apply to weight-thickness ratio, glass content, strength, light transmission, uniformity, and surface finish. Includes sample specifications. *Corrulux Division, Libbey-Owens-Ford Glass Co., P.O. Box 20026, Houston 25, Tex.*

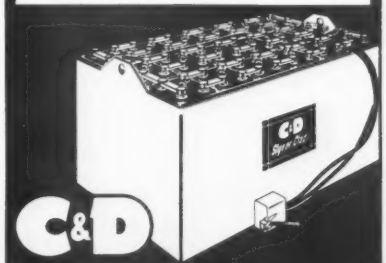
at National Biscuit Company—



C&D Batteries for EXTRA work

National Biscuit Company, famous for top quality food products since 1898, uses millions of pounds of wheat, sugar, shortening, cheese, chocolate and figs yearly to supply the vast consumer demand for their delicacies. To help handle this huge quantity of materials, Nabisco uses C&D Slyver-Clad* batteries in a number of its plants as a major source of power for their industrial trucks employed in daily operation. For National Biscuit, like hundreds of other important companies, has found it pays to power with C&D Slyver-Clad batteries.

C&D Slyver-Clad batteries are approved as standard equipment by all electric truck manufacturers. For further information, write for catalog. *T.M. Reg.



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CATALOG 103—(Model CK Series) High pressure pumps in capacities from 5 to 200 g.p.m. and pressures to 400 p.s.i.

CATALOG 104—(Model M Series) Coolant pumps with automatic internal by-pass. Capacities from 2 to 50 g.p.m. and pressures to 15 p.s.i.

CATALOG 105—(Model R Series) Automatic reversing pumps in capacities from ¾ to 200 g.p.m. and pressures to 100 p.s.i.

CATALOG 106—(Types S and SA) Stripped pumps for built-in applications. Capacities from ½ to 200 g.p.m. and pressures to 100 p.s.i.

CATALOG 107—(Type SU) Multiple V-belt pumping units in capacities from 2 to 50 g.p.m. and pressures to 300 p.s.i.

Tuthill pumps are of the rotary, internal-gear, positive displacement type.

Any one or more of these Tuthill catalogs are available on request. They include individual pump guides to help you select the Tuthill pump best-suited to your requirements. Please ask for catalogs by number.

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Wagner Hydraulic Company, 10633 Wellworth Avenue
Los Angeles 24, Calif., ARizona 8-5332 and BRadshaw 2-2091

HELPFUL LITERATURE

"Compact" hydraulic cylinders

An eight-page catalog (54-68) describes new "Compact" hydraulic cylinders for general industrial application. Design features are illustrated by cutaway photographs. Two pages of engineering data include instructions for ordering and a chart of approximate shipping weights. Schematic diagrams illustrating principles of differential oil-hydraulic circuits are given. *Vickers Incorporated, 1400 Oakman Blvd., Detroit 32, Mich.*

Developments in industrial air engineering

A brochure, "Some of the Newer Major Manufacturing Developments in Which Ross Engineering Has Played a Prominent Part," contains examples of recent solutions in air engineering. Contributions Ross has made in automotive, television, and pulp and paper industries are chronicled and illustrated. *J. O. Ross Engineering Corp., 444 Madison Ave., New York 22, N. Y.*

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Materials handling report

Field report, No. 48, describes profitable handling of hides, tanbark, chemicals, and miscellaneous machinery with Hyster's XA-60 lift truck. Report, which is illustrated, offers case history of handling and storing in conjunction with Hyster models. *Hyster Co., P.O. Box 4318 Portland 8, Ore.*

Facts on high temperature insulation

Thermoflex, a multi-purpose refractory-fiber felt for service to 2,000 deg. F., is described in this six-page illustrated folder. Included are tables and data on low conductivity factor, sound absorption qualities, densities, sizes and thicknesses. *Johns-Manville, 22 East 40th St., New York 16, N. Y.*

Cored, bar, and plate stock data

A six-page catalog (CB-54-1) lists over 597 Oilite standard size cores, bars, and plates. Oilite service map is included showing location of 14 field engineers and completely stocked depots throughout North America. *Dept. 164, Chrysler Corp., Amplex Division, Detroit 31, Mich.*

Stainless steel in building

Opportunities for use of stainless steel in building are discussed in a handsome 24-page brochure, "A Guide to Future Uses of Stainless Steel in Architecture and Building." Included is a section giving a technical briefing on composition and characteristics of standard stainless steels made by Crucible. *Crucible Steel Co. of America, Henry W. Oliver Bldg., Pittsburgh 22, Pa.*

Dielectric heating bulletin

Operating advantages of Allis-Chalmers dielectric heaters are covered in this new bulletin (15B6431B). Literature claims heaters aid in cutting costs in heating, drying, baking, or curing of nonconduction materials. Included is a chart of specifications and dimensions. *Allis-Chalmers Manufacturing Co., 1088 S. 70th St., Milwaukee, Wisc.*

Brake shoe shine?

Automatic cleaning and surfacing automotive brake shoes for subsequent bonding of linings is covered in Bulletin 205. Two case histories demonstrating advantages of automatic airless abrasive blasting process are given. *American Wheelabrator & Equipment Corp., Mishawaka, Ind.*

Preserving concrete floors

This pocket-size folder explains use of Stontop, a product for use in eliminating concrete "dusting." Stontop is also said to seal surfaces against food acids, grease, oil, and abrasive wear. Bulletin states application is simple and material will not discolor floor. *Stonhard Co., 1306 Spring Garden St., Philadelphia 23*

New steel structures in the West

This brochure contains numerous illustrations and information on recently erected steel-framed structures in the West. Buildings shown in process of construction include carbide plant and pulp mill. *Bethlehem Pacific Coast Steel Corp., 20th & Illinois Sts., San Francisco*

Fastener bulletin available

Typical applications for new Tuff-Tite multi-purpose fasteners are listed in this publication. Brochure TL97 explains and pictures how unusual design and components of fasteners prevent leaks, protect surfaces, absorb shock, and stop squeaks. *Townsend Co., New Brighton, Pa.*

Fiberglas building panels

A four-page color folder contains up-to-date information on expanded line of Alsynite translucent fiberglas building panels. Full range of 20 standard colors are shown. Literature offers complete statistical data, including specifications on all series. *Alsynite Co. of America, 4654 De Soto St., San Diego 9.*

How to care for tools

"V40 for Tool Room Grinding" describes a complete new line of tool room wheels and lists hints for conservation of tools. Included in brochure is a handy tool room chart which spells out recommendations for grinding high speed tool and die steels. *The Carborundum Co., Niagara Falls, N. Y.*

Split ball bearing guide

This 24-page catalog (54) describes and pictures complete line of split ball bearings. Load and speed ratings, design data, and dimensions are given, in addition to details on various design features possible with fractured race bearings. *Split Ballbearing Corp., Lebanon, N. H.*

ONE QUICK STROKE!
Your load's ready to ROLL . . . with NEW "PAL-BOY"
SINGLE STROKE MECHANICAL LIFT PALLET TRUCK

Amazingly easy to handle, lighter, smooth-rolling, new low-priced "Pal-Boy" is a great time-saver on single or double Pallet loads up to 2500 lbs. ONE swift handle-stroke lifts your load to rolling position. New ball bearing booster rollers on each fork simplify positioning under pallets. Has many new safety and load-saving features.

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WEST BEND EQUIPMENT CORPORATION
Materials Handling Engineers
307 Water Street, West Bend, Wisconsin

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1 OAKITE GIVES YOU
2 THREE WAYS
3 TO FIGHT RUST

Day and night—wherever your steel is stored or handled—RUST, the biggest thief in America, is robbing you of production, robbing you of profit

Oakite can help you defeat rust these three ways:

☆ **1** By removing rust from raw steel.

☆ **2** By preventing rust during processing.

☆ **3** By preventing under-coat rusting of painted products.

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Technical Service Representatives in Principal Cities of U. S. & Canada

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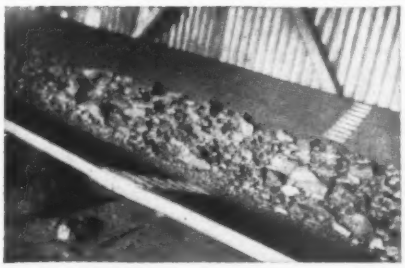
FLEXCO®
BELT FASTENERS and RIP PLATES



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★ FLEXCO Fasteners make tight butt joints of great strength and durability.
★ Trough naturally, operate smoothly through take-up pulleys.
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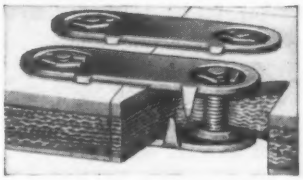

Compression Grip distributes strain over whole plate area

Order From Your Supply House. Ask for Bulletin F-100

FLEXIBLE STEEL LACING CO.
4642 Lexington St., Chicago 44, Ill.

HELPFUL LITERATURE

Guide to basic switches

This 28-page brochure describes 10 classifications of standard line Micro Switch phenolic enclosed, precision snap-action basic switches. Over 400 listings of basic switches, auxiliary actuators, and terminal enclosures are covered. Catalog 62 comes complete with photographs, dimensional drawings, terminal variations, and electrical ratings. *Micro Switch Division, Minneapolis-Honeywell Regulator Co., Freeport, Ill.*

Electric conductor manual

This 190-page illustrated volume, "Kaiser Aluminum Electrical Conductor Technical Manual," is a comprehensive reference on egnineering aluminum conductor installations. Data are presented to enable user, by simple calculations, to easily evaluate essential design information. Approximately 72 pages of industry specifications have been reproduced for ready reference. *Kaiser Aluminum & Chemical Sales, Inc., 228 North LaSalle St., Chicago 1*

Cold forged parts manual

This 12-page brochure displays special rivets, nails, screws, and small parts manufactured by cold heading process. Catalog 58 also includes sections on secondary operations, metals, finishes, and complete specifications. *John Hassall, Inc., Westbury, Long Island, N. Y.*

Describes air-grip clutch

This compact, illustrated booklet presents extensive information about newly developed Dodge air-grip clutch. Tabular data in bulletin A-634 include clutch sizes, dimensions, bore sizes, weights, and list prices. *Dodge Manufacturing Corp., Mishawaka, Ind.*

Patching metal and plastic

Bulletin on new Furane patching compound H-783-A for repairing metal and plastic outlines characteristics and use of aluminum-filled epoxy resin preparation. According to bulletin, patching compound can also be used for repairing wood, glass, and ceramics. EP-54-19. *Furane Plastics, Inc., 4516 Brazil St., Los Angeles 39.*

Coated abrasives handbook

A 60-page "Production Digest" assembled from 20 technical papers on coated abrasive grinding and polishing techniques is available. Subjects covered include: coated abrasives theory and practice, contour polishing and grinding, inside polishing of recesses and small openings, and conversion of polishing jacks to belt usage. Brochure is profusely illustrated with photographs, drawings, and tables. *Behr-Manning Corporation, Dept. PD-54, Troy, N. Y.*

Stainless tubing data

This six-page folder "B&W Seamless or Welding Stainless Mechanical Tubing" presents descriptive material and advantages in use of tubing. Folder TB 365 provides finishes, size ranges, types, and shapes of stainless tubing available. Also offered is a table of condensed properties and processing data for nine popular grades of stainless tubular products. *The Tubular Products Division of the Babcock & Wilcox Company, Beaver Falls, Pa.*

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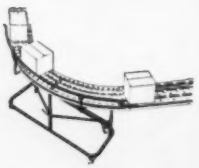

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SEATTLE Air-Mac, Inc. of Washington, MU 3388, 3838 4th Ave., S., Seattle 4, Washington

PORTLAND Air-Mac, Inc. of Oregon, Elmore 6524, 1435 S.E. Union Ave., Portland 14, Oregon

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Fast gasketing method shown

A high speed, economical method of industrial gasketing that eliminates hand assembly is explained in this 12-page, illustrated booklet. Process is particularly adapted to parts or assemblies designed to contain pressure, hold a vacuum, form a hermetic seal, or act as a cushion. *Dewey and Almy Chemical Company, Dept. 69, Cambridge 40, Mass.*

For easier pallet moving

A motorized system for horizontal movement of pallet loads is described in bulletin 551. Literature illustrates construction and operating features of Pallet Ox and gives full specifications. Turning radii, aisle clearances, and ramp performance are pictured by engineering line drawings. *Barrett-Cravens Co., 628 Dundee Road, Northbrook, Ill.*

Transportation engineering reviewed

Numerous photographs pictorialize scope of operations at Wetmore Hodges in this brochure. Among research activities described are design of special and general purpose vehicles, modification and refinement of existing models, and evaluation of vehicles and accessories. *Wetmore Hodges and Associates, Inc., Chestnut at Spring St., Redwood City, Calif.*

Metal finishing aid

A new 42-page booklet, "Abrasive Grain and Powders," for use in metal finishing is available. Packed with informative charts and illustrations, brochure, No. 14, contains many latest abrasive engineering recommendations. Included is a suggested layout for set-up room and curing room and chapters on metal buffing, metal tumbling, and pressure blasting. *The Carborundum Company, Niagara Falls, N. Y.*

Tells about paper shredder

A heavy duty paper shredder that shreds one ton an hour is described in folder HW-29. Hommel Kleen Kut Paper Shredder is available in two models: one adjustable to cut 1/8" to 7/16" shreds, the other permanently factory-set to shred any dimension ordered from 1/64" to 7/16". Shredder is claimed to cut economically any paper from oiled or waxed tissue to chip board. *Hommel Machine Works, 2340 Adeline St., Oakland 7*

New fire resistant chemical

All available details on Borotherm, a recently-introduced fire resistant chemical, are offered in this booklet. Information includes listing of suggested uses in various industries and formulation and fire test data. *American Potash & Chemical Corporation, 3030 W. 6th St., Los Angeles*

Die handling truck line

An illustrated folder contains design features of a new line of hydraulic die handling trucks. Operation enables typical die setting time with a 14,000 lb. die in only eight minutes. Literature contains design, operating, and application information. *The Elwell-Parker Electric Co., 4205 St. Clair Ave., Cleveland 3, Ohio*

"Float-Treat System"

. . . for water, sewage, and trade wastes treatment is subject of this new booklet. Process is used to separate greases, chemical flocs, and suspended organic matter from industrial waste liquids. Plan views, diagrams, photos, and text are employed in bulletin 54-82 to describe system. *Chain Belt Company, Dept. PR, Milwaukee 1, Wis.*

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- Complete stocks
- All kinds . . . all sizes
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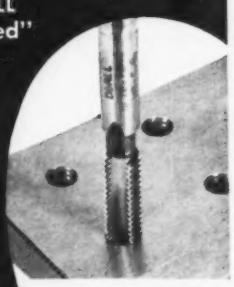

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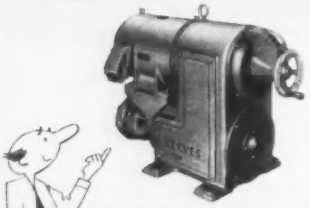

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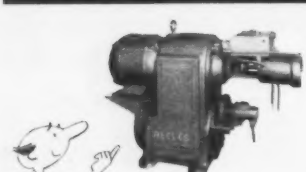

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Repair Parts and Complete Units in Stock

New fork truck specifications

Here are two new circulars describing Lewis-Shepard's Model "M," high lift electric straddle type fork truck. Designed for 6'-0" aisle operation, truck is available in "articulated" and "narrow" styles. Literature contains numerous diagrams and complete technical data. Ask for Circular 35A and 35B. *Lewis-Shepard Products, Inc., Dept. R-68, Watertown, Mass.*

Precision-ground reamers

This eight-page precision-ground reamer catalog lists one of largest available ranges of sizes and types. Among types covered are hand reamers, shell, expansion, taper pin, stub, chucking, decimal, and dowel pin reamers. Specifications are given in handy chart form. *The DoAll Company, Des Plaines, Ill.*

Self-lubricating bearings

Bearing classifications, installation procedures, recommendations for machining, and other information on sintered bronze, brass, iron, steel, and oil impregnated bearings are contained in a 40-page illustrated catalog offered by *Edward D. Maltby Co.*, representing Wakefield Bearing Corp. Direct inquiries to Maltby, *1718 South Flower St., Los Angeles 15.*

"The One-Truck Fleet"

. . . a 16-page, two-color brochure, outlines increasing application of straddle carriers in materials handling. Booklet demonstrates advantages by using case histories documented by on-the-job photographs. Included is a table of model specifications. *Industrial Truck Division, Clark Equipment Company, Battle Creek, Mich.*

Electric plants for civil defense

A special issue of "Power Points Digest" (Volume 10, No. 6) is devoted entirely to use of electric plants for civil defense purposes. This 16-page pocket-sized booklet explains adaptability of Onan electric generating plants to requirements of civil defense. Several examples of present uses are included. *D. W. Onan & Sons Inc., 2515 University Ave., S.E., Minneapolis 14, Minn.*

Details on rust preventives

This 24-page, illustrated catalog displays 98 color chips of Rust-Oleum products and includes complete instructions for surface preparation and application. Several new products are pictured and discussed. Application photos are used throughout brochure to show exactly how each type of item is used. Two pages of catalog, Form No. 254, are devoted to questions and answers. *Rust-Oleum Corporation, 2799 Oakton St., Evanston, Ill.*

Truck pump literature

A rotary truck pump which is suitable for handling petroleum products and aromatic aviation fuels and solvents is described in this folder. Specification sheet 200-C gives features, construction details, and general dimensions as well as a selection chart. *Blackmer Pump Company, Grand Rapids, Mich.*

Illustrates paint heater line

This four-page bulletin provides dimensions and other technical data on paint heaters for all types of installations. Photographs of various heaters are shown along with specifications. Cross sectional diagrams explain how heaters operate. *Bede Products, Inc., 1110 Brookpark Road, Cleveland 9*

WESTERNERS AT WORK

ARIZONA

Chase Brass and Copper Co., Inc.
Glenn P. Bakken of Phoenix is elected executive vice president of this Waterbury, Conn., subsidiary of Kennecott Copper Corp.

CALIFORNIA

Alloy Rods Co.
George M. Hohmann, manager of company's Pacific Coast Division, is named vice president in charge of production at company's main offices in York, Pa.

Cutter Laboratories
T. R. Sandberg becomes vice president for manufacturing of this Berkeley pharmaceutical firm. He has served as director of manufacturing since 1948.

Arcturus Manufacturing Corp.
E. C. Rork is appointed vice president of this Venice drop forging company. He joined firm in 1939 and since 1949 has held post of plant manager of machine and forge divisions.

Borg-Warner Corp.
A. A. Mathewson is named assistant to president of this company's Petro-Mechanics Research division, now engaged in drill development project at North Hollywood. He was formerly with Albert G. Bodine, Los Angeles.

Crown Cork and Seal Co.
Russell Gowans, president of company's Western Division, San Francisco, becomes president of parent company at Baltimore.

United States Steel Corp.

Above left: *T. R. Rooney*

Above right: *J. B. Du Prau*

At left: *Kenneth Lieber*

T. R. Rooney is appointed vice president of production for Consolidated Western Steel Division, with headquarters at Maywood plant. He has been vice president-production of Consolidated Western's San Francisco district. *Kenneth Lieber* becomes vice president-engineering of Consolidated Western, advancing from post of assistant vice president and manager of pipeline sales which he has filled since 1952. *J. B. Du Prau* is named assistant to president of this division, in addition to duties which he has held since 1949 as vice president and assistant to president of U. S. Steel's Columbia-Geneva Steel Division.

Thurmond Industries, Inc.
Charles H. Parisek is named vice president and sales manager of this Los Angeles veterinary chemicals and insecticides manufacturing company. *Richard M. McFarland* becomes assistant to president.

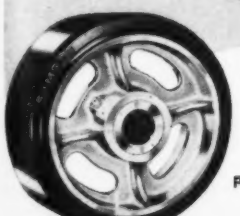
Spreckels Sugar Co.
Newly-created position of general superintendent and director of industrial relations in charge of this company's three plants is *Ernest M. Hartman*, former superintendent of company factory at Spreckels, Calif.

Southern Counties Gas Co.
Jay Davis, Jr., former manager of construction and distribution, and *James A. Millen*, former manager of transmission and supply, are elected vice presidents of this company.

Pacific Motor Trucking Co.
Robert K. Booth is appointed vice president and *Robert K. Lattin* is appointed general manager of this subsidiary of Southern Pacific Co. *B. R. Johnson* becomes assistant general manager. *G. D. Clark* is named district manager and *R. M. Marshall* assistant district manager, San Francisco, and *J. L. Kennedy* is new district manager in Tucson, Ariz.

SAMSON WHEELS

Made by a rubber manufacturer



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Durability — built in by 50 years of Revolvator Co. experience—is still the fundamental of the Red Giant liftruck line. Maneuverability, plus the safety of their exclusive double stroke mechanism, make the models shown leaders in their fields. There is a Red Giant liftruck available for every use—for every capacity.

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WESTERNERS AT WORK

Marquardt Aircraft Co.

This Van Nuys firm appoints as director of long range planning and research programs *John A. Drake*, who is succeeded as chief engineer—power plants by *John S. Winter*. *Leigh Dunn* is named chief engineer—test facilities, and *John S. Liefeld* becomes director of manufacturing.

Grant & Bruner, Ltd.

Kenneth C. Grant and *Edwin L. Bruner*, Los Angeles consulting engineers, dissolve corporation to set up separate practices as consultants.

Santa Fe Railway

Francis N. Stuppi, superintendent of company's valley division, is appointed acting assistant general manager of coast lines, with headquarters in Los Angeles. *Sid Rogers*, superintendent of Albuquerque division, succeeds Mr. Stuppi. *Aubrey Johnson*, former trainmaster at Fresno and now assistant Los Angeles division superintendent, becomes acting superintendent of that division.

Camoose Mines, Ltd., of Canada

George C. Heikes of Los Altos is named consulting mining geologist for this firm, which has offices in Los Angeles, and will have charge of development work in Idaho, Colorado, Utah, and Canada.

Hycon Manufacturing Co.

Rear Admiral J. S. Laidlaw, USN, ret., joins this Pasadena firm as staff assistant to president.

Union Carbide and Carbon Corp.

C. N. Rucker, former superintendent of gas and utilities at company's South Charleston, W. Va., plant, is appointed superintendent of new Torrance Plant.

Union Oil Co.

Elmer H. Weaver, former director of procurement and contracts, is elected vice president of this Los Angeles company. *John Sloat*, *Charles F. Manlove* and *Edward W. Scott* are appointed to administrative staff of Western area exploration department. *John E. Kilkenny* is named chief geologist of Pacific Coast division, and *Fred W. Bush* is manager of lands. Williston Basin and Rocky Mountain divisions of company are consolidated under *W. E. Morgan*.

Caterpillar Tractor Co.

Alan Parry, factory manager of San Leandro plant since 1945, is promoted to position of manager of San Leandro operations, succeeding *W. O. Bates, Jr.*, who has retired.

Superweld Corp.

This North Hollywood metallurgical process firm appoints *Robert W. Lester* chief engineer and *Hoyt H. Todd* chief metallurgist. Mr. Lester was formerly vice president of California Alloy Products Co. and earlier was associated with C. F. Braun and Lockheed Aircraft Corp. Mr. Todd last served as chief metallurgist for Kobe, Inc., with prior experience at Security Engineering, Rohr Aircraft, Southern California Edison Co., and Consolidated Vultee.

Bendix Aviation Corp.

Maurice W. Horrell, director of engineering and assistant general manager of company's computer division at Los Angeles since 1952, is named general manager, succeeding *Palmer Nicholls*. He has been with Bendix since 1948.

Wooldridge Manufacturing Co.

Head of this company's new Sunny ale plate and tank division is *Roman V. Gan in*. He was formerly chief engineer for a Peninsula steel firm.

General Petroleum Corp.

Thomas P. Simpson is elected vice president and director of manufacturing of this California oil company with headquarters in Los Angeles. He has been with company and Socony-Vacuum, its affiliate, since 1924 and last held post of assistant director of manufacturing. In his new position he succeeds *Gale L. Adams*, retired. *James T. Rothenberger* is appointed general maintenance superintendent at companuy's Torrance Mobilgas refinery, an advancement from post of assistant maintenance superintendent.

General Metals Corp.

This San Francisco firm appoints *Philip F. Thayer* vice president and general manager of its metals division, which operates foundries, forge, and pipe fittings plants in Oakland, Los Angeles, and Houston. He has been general manager of Willamette Iron and Steel, Portland, Ore., for past six years.

P. F. Thayer
General Metals Corp.

M. B. Riordan
B. J. Service, Inc.

BJ Service, Inc.

Matthew B. Riordan is named vice-president in charge of engineering research, and development at this wholly-owned subsidiary of Byron Jackson Co. with headquarters in new facility at Long Beach. He has been with Byron Jackson since 1941 in company's oil well equipment research and electronic development department.

General Motors Corp.

Leighton E. Caldwell is named manager of General Motors training center in San Leandro. He has been with company's Electro-Motive Division since 1937.

Nut Corp. of America

Philip V. Tarr, former assistant general manager and chief engineer of powdered metal products division of Kwik Set Lock Co., is named chief engineer and secretary of this Compton firm.

Carnation Co.

William Steinhart is elected secretary of company, succeeding *S. A. Halgren*, who was recently promoted to vice president in charge of public and industrial relations. Assistant director of industrial relations is *Roland M. Jones*, who has been Western district superintendent in evaporated operating division since December 1952.

Robert F. Edwards, superintendent of Gustine plant, is advanced to post of Western district superintendent, with headquarters at Gustine. He is replaced by *Jerome B. Jansen*, former superintendent at Sheridan, Mich., plant.

Crown Zellerbach

Frank L. Youngman is elected president of Crown Zellerbach Canada, Ltd., and Elk Falls Co., Ltd., to replace *Paul E. Cooper*, who resigned recently. *Robert H. R. Young* is named to newly created post of vice president and general manager. He has been assistant vice president of manufacturing for Crown Zellerbach Corp. in San Francisco.

Reed O. Hunt, former vice president for manufacturing, now fills newly created position of vice president for operations of Crown Zellerbach Corp. He is succeeded by *Peter T. Sinclair*, former vice president for manufacturing.

Fabriform Metal Products (Division of George Getz Corp.)

Kenneth L. Glick, formerly production manager, is appointed to post of general manager: *A. M. Thompson* remains as sales manager: and *Mario R. Glick* is retained by company in an inactive status to act as field consultant for management of this metal working company recently purchased by George Getz Corp., Chicago.

Kendall Foods, Inc.

Walter Poulsen is appointed chief engineer and plant manager of this Los Angeles dog food manufacturer recently acquired by Standard Brands.

Librascope, Inc.

Richard E. Hastings is named general manager of this Glendale firm's subsidiary, Minnesota Electronics Corp. of St. Paul, Minn. He has been personnel director of Librascope, which he joined in 1951.

Masonite Corp.

William A. Cotton, manager of domestic hardboard plant at Ukiah, is elected vice president of corporation. *J. H. Rauen*, formerly at Masonite's Laurel, Miss., plant, is promoted to manager of Ukiah central planning section. *J. J. Allegretti* becomes manager of product development and market research, succeeding *T. M. O'Neil*, who has resigned to become vice president and director of Nuodex Products Corp.

Kaiser Aluminum and Chemical Corp.

Frank M. Cashin, manager of chemicals division, is appointed a vice president of this Oakland corporation, with which he has been associated for past 12 years.

Kaiser Steel Corp.

Wilfred R. Riggs, Jr., is named assistant director of general planning, and *Robert H. Howard* appointed supervisor, general planning, reporting to Mr. Riggs. Both have been with company since 1949.

Kay Lab

This San Diego electronics firm adds two new staff members: *Richard Reyburn*, as chief of tests, and *Earl Cunningham*, to do development work on television camera equipment.

Standard Oil Co. of Calif.

John S. Tate is appointed assistant treasurer. He has been with company since 1947.

Avco Manufacturing Corp.

Director of newly-established West Coast division of this company in Los Angeles is *James R. Kerr*.

Stanford Research Institute

Dr. Jerre D. Noe is named assistant director of engineering research, to supervise newly formed computer and control systems laboratories at Stanford. *Dr. Byron J. Bennett* is new manager of computer laboratory, and *Dr. Kenneth R. Eldredge* heads control systems laboratory.

Charles A. Scarlott, former editor of "Westinghouse Engineer" and co-author of books on industrial science, joins public relations department of Institute as manager of technical information services. *Dr. Nevin K. Hiester* is appointed manager of chemical and metallurgical engineering section. With SRI since 1949, Dr. Hiester has led research programs of ion exchange, food processing, industrial hygiene, fluid flow, and heat transfer.

Latchford-Marble Glass Co.

William J. Latchford is elected president of this Los Angeles glass container manufacturing company; *E. E. Balling*, executive vice president; *William Simkins*, vice president in charge of sales; and *J. H. Pettker*, vice president in charge of production.

Lear, Inc.

Ted Grohs joins aircraft engineering division of this Santa Monica firm in post of special assistant to chief engineer and director of research and development. Previously self employed as an aviation artist and designer, Mr. Grohs will work on design of new Lear products.

California Chassis Co.

Rulon B. Everett joins this South Gate electronic manufacturer as secretary of the board and office manager.

PROPERLY SPANNING
this *SMALL* difference

WILL MAKE A *BIG* DIFFERENCE IN YOUR LOADING COSTS!

This Magliner Dock Board was custom-engineered to meet the exact span requirements of this specific dock! It provides a safe and secure rapid-transit bridge between the dock and the car. As a result, it simplifies and speeds loading operations . . . and greatly reduces dock handling costs! Magliner Dock Boards are strong, safe and dependable. *And*, they're magnesium-light for easy one-man handling! Magliner Dock Boards can lower your dock loading costs too! It will pay you to get the facts.

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from corrosion by most acids, alkalis, solvents, oils and grease

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NITRO-DUR cures to a hard, tough film with excellent adhesion to metal and concrete surfaces. It is unaffected by spillage, splash and fumes of most acids, alkalis, solvents, oils and greases—and is not softened by temperatures as high as 200° F.

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Write our Pacific Coast representative nearest you for Bulletin N-D 52 which gives more complete information.

We have specialized in corrosion-proof construction since 1912. Four decades of experience is at your call through our on-the-spot representatives. EL CHEM service is *complete*: engineering, plans, materials and installation. Surveys, recommendations and estimates without obligation.

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Offices: Atlanta, Chicago, Cleveland, Detroit, Fort Worth, Indianapolis, Newark, New York, Pittsburgh, St. Louis, St. Paul, San Francisco, Seattle — and Norwalk, Calif.; Stratford, Conn.; Charlotte, N. C.; Seneca Falls, N.Y.; Jenkintown, Pa.; Westwood, Mass.

Headquarters for RIVETS
(Tubular, split and special cold-formed)
and Rivet-setting Machines

WESTERNERS AT WORK

COLORADO

C. A. Norgren Co.

C. Neil Norgren becomes executive vice president of this Denver firm, filling a newly created post. He has been serving as vice president and assistant general manager. *Delbert G. Faust*, former chief engineer, is new vice president in charge of sales and advertising. *Leigh H. Norgren*, who has been with company for eight years, becomes vice president in charge of engineering and production. *George L. King*, former office manager and general counsel, is named treasurer, and *J. A. Wilson*, former assistant chief engineer, is appointed chief engineer.

Denver Research Institute

Dr. Philip H. Leighly
Denver Research Institute

Dr. Philip H. Leighly is appointed to staff of metallurgy division, Denver Research Institute, to head research in titanium alloys. A graduate of Oak Ridge School of Reactor Technology, he was formerly with Bendix Research Laboratories.

IDAHO

General Electric Co.

Wayne H. Perry is picked to head GE aircraft nuclear propulsion department at National Reactor Testing Station, Idaho Falls. Mr. Perry has been an associate secretary of GE since 1952.

Kemmerer Coal Co.

New company president is *Glen E. Sorensen*, who moves up from post of vice president and general manager of this Kemmerer firm. *John L. Kemmerer*, former president, is named chairman of the board.

NEW MEXICO

International Minerals and Chemical Corp.

Ed C. Skinner, industrial engineer at company's potash division at Carlsbad, advances to general superintendent of that operation. *Walter B. Shaw*, technical advisor to refinery and chemical plant staff, is appointed to position of process engineer, and *Jim Bill Berkstresser* and *Neal Chapman* transfer to division's mine engineering department.

OREGON

U. S. Plywood Corp.

Gene C. Brewer is named vice president of this firm, heading its 16 West Coast manufacturing plants. He has been manager and president of Shasta Plywood, Inc., at Redding. *O. Harry Schrader, Jr.*, becomes general manager of company's Seattle operation, succeeding *L. J. Walby*, who has resigned.

Shepard & Morse Co.

Milton B. Luton, general manager of Inman-Poulsen Lumber Co. before its purchase by Georgia-Pacific Plywood Corp., is named general manager of this firm's western division, with headquarters in Westport.

Electric Steel Foundry Co.

Dean Burgan *Dr. Wm. H. Rice*
Electric Steel Foundry Co.

Dean Burgan and *Dr. William H. Rice* join technical staff of this Portland company. Mr. Burgan, who has been on staff of Battelle Memorial Institute for the past 12 years, will work in metallurgical department, and Dr. Rice, who was head of welding department of Oklahoma A. & M., will work on cast weldment design and cast fabrications.

M and M Wood Working Co.

Paul Karstedt is named assistant to president of this Portland company. His position as treasurer is filled by *F. C. Rockefeller*, formerly controller, and *E. E. Swanson* moves up to post of controller.

WASHINGTON

Aluminum Co. of America

Waldo Porter is named to newly-created post of power manager of Alcoa's Northwest operations, with offices at Vancouver. His former post as Vancouver Works chief electrical engineer is filled by *W. E. Lawton*.

Bethlehem Pacific Coast Steel Corp.

M. M. Mosley *T. E. Gillen*
Bethlehem Pacific Coast Steel Corp.

Malcolm M. Mosley is appointed superintendent of rolling mills at Seattle steel plant. He has been assistant superintendent since 1948. New chief engineer of Seattle plant is *T. E. Gillen*, who has been with Bethlehem Pacific's engineering department since 1939.

Yellowstone Pipe Line Co.

Newly-created position of superintendent of this company, subsidiary of Continental Oil Co. which is building line from Billings, Mont., to Spokane, is filled by *N. B. Mavris*, who will make his headquarters in Spokane. He has been assistant chief engineer for parent company since 1952.

ASSOCIATIONS ELECT

National Wood Tank Institute:
President, *William S. Hager, Jr.*, vice president of George Windeler Co., Ltd., San Francisco.

Furniture Manufacturers Assoc. of Southern California:
President, *H. J. Malerstein*, Quality Furniture Manufacturing Co.; vice president, *Richard A. Sax*, Fashion Furniture Manufacturing Co.; treasurer, *Joseph Siskin*, Angelus Furniture Manufacturing Co.; executive secretary, *Edward S. Feldman*.

Vertical Turbine Pump Assoc.:
President, *Warren L. Bremer*, vice president, Layne & Bowler Pump Co., Los Angeles; secretary-treasurer, *B. A. Tucker*, sales manager, Peerless Pump Division, Food Machinery and Chemical Corp., Los Angeles.

Consulting Engineers Assoc. of California:
President, *William W. Moore*, Dames & Moore, San Francisco; vice president, *Stephenson B. Barnes*, State Board of Registration for Engineers; secretary-treasurer, *Homer W. Jorgenson*, Modesto.

Northwest Fisheries Assoc.:
President, *E. A. Ruthford;* vice president, *Palmer G. Olson;* secretary, *R. A. Littlefield;* treasurer, *William B. Eardley, Jr.*

American Chemical Society, Santa Clara Valley Sec.:
President, *Dr. Irving M. Abrams*, Chemical Process Co., Redwood City; chairman, *Dr. Douglas A. Skoog*, Stanford University; secretary-treasurer, *Dr. Bruce Graham*, Stanford Research Institute; council representatives, *Dr. Albert Castro*, San Jose State College; *Dr. James A. Robertson*, Food Machinery and Chemical Corp., San Jose; *Dr. James H. C. Smith*, Stanford Carnegie Institution.

National Lumber Manufacturers Assoc.:
President, *Judd Greenman*, Long-Bell Lumber Co., Vernonia, Ore.

Gas Appliance Manufacturers Assoc.:
President, *T. T. Arden*, executive vice president of Robertshaw-Fulton Controls Co., Los Angeles.

American Chemical Society (petroleum chemical division):
Chairman, *Dr. Alex G. Oblad*, Houdry Process Corp.

Idaho Motor Transport Assoc.:
President, *John G. Grant*, Boise.

Los Angeles Engineering Council of Founder Societies:
President, *R. B. Barton*, ASME, General Electric Co; vice president, *N. A. D'Arcy, Jr.*, AIME, manufacturers' agent; secretary-treasurer, *Sterling S. Green*, ASCE, Los Angeles Department of Water and Power.

American Society of Mechanical Engineers:
Rank of fellow: *Harold T. Avery*, Marchant Calculators, Inc., Oakland; *Ralph M. Barnes*, University of Calif., Los Angeles; and *Vivian F. Estcourt*, Pacific Gas & Electric Co., San Francisco.

Small Defense Industries Assoc. (new organization):
President, *Hampden Wenworth*, Longren Aircraft Co., Los Angeles; secretary-treasurer, *L. A. Pfankuch*, Sturgess, Inc., Glendale; executive secretary, *W. P. Balderston, Jr.*

Assoc. of Iron and Steel Engineers, West Coast Section (new section):
Chairman, *W. A. Marshall*, Columbia-Geneva Steel Division of U. S. Steel Corp., Pittsburg; vice chairman, *E. F. Donatic*, Kaiser Steel Corp., Fontana.

American Trucking Assocs., Inc.:
President, *Neil J. Curry*, California Cartage Co.; vice president at large, *Kenneth Humphrey*, Pacific Intermountain Express; regional vice presidents, *B. M. Seymour* (Northwest), *E. Ward King* (Southwest), and *George V. Eastes* (Pacific Coast).

American Gas Assoc.:
President, *F. M. Banks*, president, Southern California Gas Co.; vice-chairman of operating section, *Frederic A. Hough*, vice president, Southern Counties Gas Co.

American Council of Independent Laboratories, Inc.:
Secretary, *Dr. Roger W. Truesdail*, president of Truesdail Laboratories, Inc., Los Angeles.

California Wool Growers Assoc.:
President, *Lloyd Avilla*, Red Bluff.

. . . More on page 92

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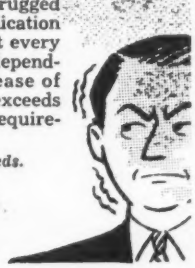

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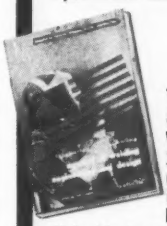

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TIS 1010
TRUCK AND CAR FLEET MAINTENANCE MANUAL. 56 pages of pictures and text giving practical welding help on "101" automotive jobs. Tells how to salvage castings, repair shafts, transmissions, clutch and drive assemblies. Describes frame and spring repairs. Invaluable for saving time, money on body repairs and for wear resistant overlays. Every industrial, repair shop and garage weldor needs this book.

TIS 800
TOOL & DIE SALVAGE MANUAL. 68 pages of effective tool and die welding and salvage recommendations. Includes basic welding procedures. Covers cast iron, kirksite and shoe or "clicker" dies. Has useful tempering chart and fully develops unique ability of "non-fusion" welding to eliminate damage to base metals. Special sections on new methods of production welding tools, producing forgeable welds. Hundreds of hints for cutting tool costs.

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TRADE WINDS

Moving up

Kaiser Steel Corp. appoints Ben G. Wisner as assistant manager, tin plate sales, with offices in Oakland. He has been with company since 1949. Oliver D. Hale, former manager of rolled steel sales and, earlier, manager of cold rolled strip sales and general sales service manager, becomes manager of plate and sheet sales. Newly appointed manager of structural and bar sales is Alan G. Grey, who joined company in 1949 and last held post of assistant sales manager, central district. His successor in the central district, Oakland, is Mark T. Anthony, who has been serving as assistant director, general planning.

Expansion

Earle M. Jorgensen Co., Oakland, acquires Tayler and Spotswood Co., San Francisco steel distributor, as a further step in company's growth program. Jorgensen also has plants in Los Angeles, Houston, Dallas, and Tulsa.

Taylor succeeds Tuffli

Kay Taylor is appointed assistant manager for Los Angeles district of United States Steel Supply Division of U. S. Steel Corp. He has been in charge of sheet and strip sales for past year. In his new post he succeeds Tell D. Tuffli, who has resigned.

Westinghouse men move

Stephen N. Donahoe becomes manager of Westinghouse Electric Corp.'s apparatus sales office in Emeryville, covering entire East Bay area. He succeeds V. A. Clemens who is assigned to Central Pacific district in San Francisco. In Butte, Mont., Donald E. Kampschror takes over apparatus sales for Montana territory. Edward E. Lacy, who formerly held that post, is appointed area sales manager for Westinghouse in its South Pacific district headquarters at Los Angeles. Glenn H. Clapp, Westinghouse sales engineer formerly at Salt Lake City, returns to Butte, where he was assigned from 1951 to 1953.

Carborundum Co. streamlines

Two new warehouse and office buildings are opened by Carborundum Co., to serve Los Angeles and San Francisco areas. Company has also reorganized sales, engineering, and other services in West into a new Pacific District, covering territory west of the Rockies. Manager of the new district is John G. Fritzinger, formerly a sales executive in Niagara Falls, N. Y., who will coordinate product sales and engineering services of all divisions of Carborundum Co. His offices are in Los Angeles. W. B. Summers, sales manager for coated products, and W. H. Homeyer, sales manager, merchandising, will also have headquarters at Los Angeles. F. J. Blake, sales manager for bonded products and grain, will be located at the Mountain View (San Francisco) office.

New assignments at Goodrich

D. J. Jakle, who has been petroleum sales representative in Pacific Zone for B. F. Goodrich Tire and Equipment Division, is promoted to Arizona state manager, with headquarters in Phoenix. He succeeds A. B. Senne. D. P. Fredell, who was formerly petroleum representative in Salt Lake and Denver districts, replaces Mr. Jakle as supervisor of company outlets in Los Angeles, San Francisco, Seattle, and Salt Lake City districts.

New quarters for Peterson Co.

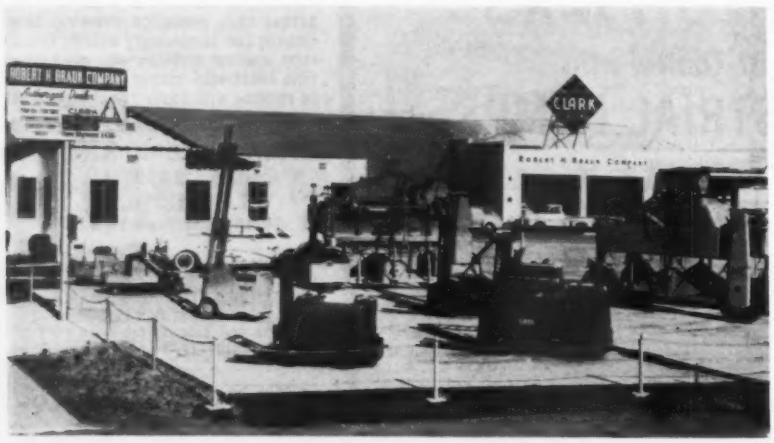
F. Somers Peterson Co. moves into new one-story office-warehouse building at 157 Thirteenth St., San Francisco, which provides 25% more space than former headquarters. Company is a distributor of industrial specialty products such as counting devices, power transmission equipment, and flexible metal hose and tubing.

Move to new quarters

Alden Equipment Co. and Snyder Engineering Corp., both headed by J. Alden Lane, move to enlarged general offices in Gardena.

Braun test center

Robert H. Braun Co., Los Angeles distributor of materials handling equipment, opens used equipment center and proving ground at its headquarters in that city. Demonstration and test driving is now offered on both new and used equipment.



Kinney-Brockway

James P. Kinney Co. of Los Angeles, distributor of materials handling and transportation equipment, takes over sales and service of Brockway trucks. Tom J. Rose, who was formerly with Brockway Pacific Truck Co., Inc., is joining Kinney.

Meier heads Phoenix branch

American Blower Corp. of Dearborn, Mich., opens direct factory branch office at Phoenix, Ariz., headed by S. A. Meier. He was formerly sales engineer at company's Los Angeles office.

S. A. Meier
American Blower Corp.

Thomas Hood
Hood Engineering Sales Co.

Hood starts new enterprise

Thomas Hood organizes Hood Engineering Sales Co., 1485 Bayshore Blvd., San Francisco, as manufacturers' representative, representing Brad Foote Gear Works and Reuland Electric Co. of Alhambra, Calif. Firm will also act as distributor for Electro-Dynamics Division of General Dynamics Corp., and has been authorized by P. J. Burrill Co. of San Leandro, Northern California representative for Warner Brake and Clutch Co., to sell the Warner line to industrial users in San Francisco.

Serving Ziegler Steel

Don Rice is named as sales representative in western part of Los Angeles County for Ziegler Steel Service Corp. He has been working in steel warehouse field in Los Angeles area for about seven years. New superintendent of Ziegler Steel's Los Angeles warehouse is Lewis H. Friend, who for the past five years has been associated with steel firms in Detroit, Mich., and Dayton, Ohio.

Expand Western headquarters

Flexible Tubing Corp. moves Western offices, sub-assembly plant, and warehouse from Pasadena to 12230 West Olympic Blvd., Los Angeles. Company's main office and plant are in Guilford, Conn.

Ducommun wins honor

Charles E. Ducommun, president of Ducommun Metals and Supply Co., Los Angeles, is presented with business achievement award by Minute Magazine, Los Angeles business news magazine.

Green-Penny branch

Gordon Lee heads new Oakland branch opened by Green-Penny Co. of Los Angeles this month. Located at 2211 San Pablo Ave. in Oakland, branch will handle products of Standard Pressed Steel Co., Hallowell shop equipment and shelving, Supreme Steel lockers and cabinets, Frick-Gallagher rotary bins and storage equipment, and other lines.

Screw Conveyor Pacific

Screw Conveyor Corp. of Hammond, Ind., activates its wholly-owned subsidiary formed in 1952, Screw Conveyor Pacific Corp., with headquarters at Santa Clara, Calif. W. E. Forster is named sales manager, to cover California, Washington, Oregon, Arizona, and Nevada. He previously operated his own firm at Sacramento. Company plans eventually to manufacture equipment at Santa Clara.

W. E. Forster
Screw Conveyor Pacific Corp.

W. O. Yates
Reynolds Metals Co.

Yates moves up

William O. Yates is named general manager of Reynolds Metals Co.'s Pacific Coast sales region, made up of nine Western states. He has been with Reynolds since 1940 and was transferred from Akron, Ohio, to Los Angeles in 1951. William T. Ingram, whom Mr. Yates replaces, is now assigned to sales headquarters in Louisville, Ky., as manager of all regional sales activities.

Caterpillar appointment

James Busey is named manager of Caterpillar Tractor Co.'s newly established parts depot in Los Angeles and will be in charge of depot's emergency overnight service to distributors in Southern California, Nevada, and Arizona. Mr. Busey joined company as a parts department employee 18 years ago and for past three years has managed a similar depot at St. Paul, Minn. Robert Webster, former export parts supervisor at Peoria, Ill., will serve as assistant manager.

New line for Wooldridge

Salem-Brosius, Inc., of Pittsburgh, Pa., picks W. P. Wooldridge Co. as sales representative in California, Washington, Oregon, and Utah for its entire line of products, including heating and heat treating furnace equipment, valves, and other special mechanical equipment for mining and metalworking industries.

Specialist

Newt Crum, factory representative for conveyor and power transmission manufacturers in California, Arizona, and Nevada, is now specializing in sales and service of Flexible Steel Lacing Co.'s products. Company manufacturers belt fasteners for joining conveyor and transmission belts. Mr. Crum has for the past five years handled firm's Flexco and Alligator belt fastener products along with his other lines.

Reliance Steel picks Gimbel

William Gimbel is named executive vice president of Reliance Steel Co., Los Angeles warehouse distributor of steel, aluminum, and magnesium. He has been with company for past seven years except for a period of service with National Production Authority in Washington, D. C. Earlier, he worked for Douglas Aircraft and Northrop Aircraft.

Bradshaw in Portland

Clark Equipment Co. appoints Joseph P. Bradshaw district sales manager in the Western region for its industrial truck division. He served as a salesman for Ross Carrier Co. in Southwest before Ross's merger with Clark and later joined a New Jersey distributor of Clark construction equipment. In his new post, he will work with J. I. Beicher, Western region sales manager with headquarters in San Francisco.

J. P. Bradshaw
Clark Equipment Co.

N. A. D'Arcy, Jr.
Amerigear-Zurn, Inc.

Pick D'Arcy

Nicholas A. D'Arcy, Jr., of Huntington Park, Calif., is appointed to represent Amerigear-Zurn, Inc., in Southern California and Arizona, handling American and Amerigear flexible couplings as well as speed reducers made by Philadelphia Gear Works, Inc. Assisting him are George Riley and John Eber.

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our March ad and our

BOOTH 171

WESTERN METAL CONGRESS

"Specialists in Metal Joining Since 1929"

FABRIFORM METAL PRODUCTS Div. of GEORGE GETZ Corp.

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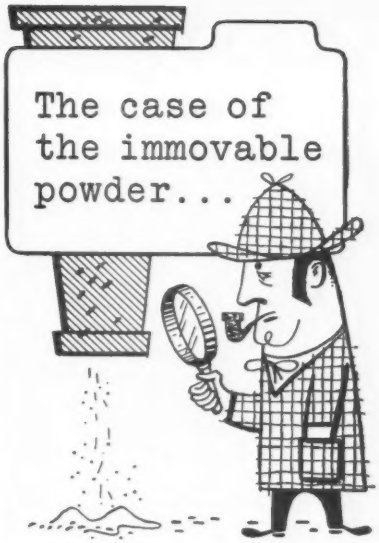

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ASSOCIATIONS ELECT

. . . Begins on page 89.

Utah Engineering Council:
Chairman, *F. C. Bates*, Bates Engineering Co.; vice chairman, *Wayne D. Turpin*; secretary, *Wayne L. Shaw*; treasurer, *Fred Richeda*.

Woodwork Institute of California:
President, *Robert Hogan*, Hogan Wholesale Building Materials Co., Oakland Calif.; 1st vice president, *Byron K. Taylor*, Taylor Millwork and Stair Co., Los Angeles; 2nd vice president, *W. Perry Acuff*, Western Lumber Co., San Diego; treasurer, *E. F. Atkinson*, Clinton Mill & Manufacturing Co., Oakland, Calif.

Utah Mining Assoc.:
President, *Otto Herres*, vice president of Combined Metals Reduction Co.; first vice president, *L. F. Pett*, general manager of Utah Copper Division, Kennecott Copper Corp.; second vice president, *Clark L. Wilson*, vice president and manager of operations, New Park Mining Co.; chairman, uranium committee, *Mitchell Melich*, Moab.

Rocky Mountain Management Club:
President, *Harry D. Cole*, Heckethorn Manufacturing & Supply Co.; first vice president, *Tom A. Danner*, Armco Drainage and Metal Products Co.; second vice president, *Hugh B. Dutell*, Gates Rubber Co.; secretary, *Dean A. Pearson*, Timpte Bros., Inc.; treasurer, *Lyle A. Walter*, Central Bank and Trust Co.

Paper Mill Men's Club of Southern California:
President, *B. E. Calhoon*, Marathon Corp.; vice president, *Jack L. Perrin*, Towlsaver, Inc.; secretary, *Asa L. Murray*, Oregon Pulp and Paper; treasurer, *Richard A. McDonald, Jr.*, Paper Products, Inc.

California Processors and Growers, Inc.:
President, *D. B. Wood*, president of Wood Canning Co., Stockton.

American Ordnance Assoc., San Francisco Post:
President, *Lawrence S. Fletcher*; first vice president, *A. B. Layton*, Crown-Zellerbach Corp.; second vice president, *J. M. Hait*, Food Machinery & Chemical Corp.; secretary-treasurer, *Col. John M. Stark*, San Francisco Ordnance District.

Society of Plastic Engineers, Inc. Southern California Section:
President, *W. H. Kadlec*, E. I. duPont de Nemours & Co.; vice president, *Paul A. Erskine*, Hess, Goldsmith & Co., Inc.; secretary, *A. Allen Ray*, Ray Products Co., Inc.; treasurer, *Harold F. Dague*, Collins, Caldwell & Dague.

American Society of Tool Engineers (Riverside Chapter):
Charter chairman: *Elmer W. Denny*, Rohr Aircraft Corp.; first vice-chairman, *Lester Heustis*, Hunter Douglas Aircraft; second vice chairman, *Donald Watkins*, Food Machinery and Chemical Corp.; secretary, *Fred Winters*, Taylor Forge and Pipe Works; treasurer, *Hugh Foster*, Hunter Douglas Aircraft. (Newly chartered chapter.)

National Society of Professional Engineers:
Vice president of Western Region: *Lindley R. Durkee*, Federal Housing and Home Finance Agency, Seattle, Wash.

National Tool and Die Manufacturers Assoc.:
Secretary, *Harold G. Murdock*, Arrowsmith Tool and Die Corp., Los Angeles.

THE West ON ITS WAY

NEW PLANTS, EXPANSIONS, NEW INDUSTRIES, PRODUCTION CONTRACTS, DEVELOPMENT PROJECTS, UTILIZATION OF RESOURCES

Western trucking grows still larger

One phase of Western trucking that showed noticeable improvement in 1954 was the expansion of refrigerated trailer fleets, and this will continue throughout 1955. The shipping needs of frozen food processors and producers of products requiring handling at specified temperatures will certainly receive plenty of attention this year. Here again, equipment is being constantly improved.

The number of pieces of trucking equipment in use increased in 1954 and the trend will continue in 1955. Although the extension of certified routes will not materially change, areas where freight hauling is either not available by other means of transportation, or is limited, will receive more service from the trucking industry. Such a situation has been created by the boom in uranium mining in Utah where trucks have made possible the rapid expansion of ore production.

Perhaps the most significant trend of the year was the van requirement for greater cubical content. Substitution of light metals, plastics, improved packaging, etc., have all led to loads of lighter and still lighter specific weight. This, in turn, meant that more frequently than not, the for-hire carriers of general merchandise were carrying a full volumetric load but substantially less than allowable legal loads. The answer was found in vans with increased cubical content reached by improved van design.

With operating costs still increasing, many truck operators are seeking equipment which may be used to carry payloads in both directions. In 1953 several operations were successfully completed. These units could carry bulk materials, such as grain, in one direction and vegetable lugs or similar merchandise in the opposite direction. During 1954 this phase of trailer design was even further exploited so that bulk fuel oil could be hauled in one direction and bulk cement in the other.

Forest products markets expanding

Lumber production in the Oregon and Washington Douglas fir regions for 11 months of 1954 was 8.6 billion fbm. compared to 9.6 billion for the same period in 1953. Production losses during the strike would have more than made up the difference.

Hardboard

Western hardboard promotion was stepped up during 1954 to the point where it led all other forest products by accounting for 5% of the selling price. Largely as a result of this intense promotion and advertising campaign, hardboard, only a 7-year-old industry, enjoyed a prosperous year.

Resins remains the most expensive material going into hardboard, constituting only 2% to 8% of the board, but approximately 10% of the selling price. Resin costs are around 20c per pound.

There is still a good deal of competition from hardboards produced in Scandinavia but the price advantage of foreign material is not quite as great as it was.

Continued growth of the industry depends upon: (1) increased process and market development to a point where hardboard is the superior material for special uses, (2) development and application of the many uses of reconstituted waste wood, and (3) a reduction in costs through greater production efficiency.

Container board uses for hardboard have been growing rapidly in acceptance, the biggest single market being in California for agricultural production.

Shakes

Noticeable increases in market came from farm building in the Midwest, due in large part to the poor resistance of other siding materials to violent wind. The California market, something of a disappointment in 1953, showed a big increase during 1954, while the Atlantic States demand remained good and the Texas demand very good.

Consumer acceptance of processed shakes showed growing popularity during the year. The size of the industry in the Pacific Northwest showed no net change.

Shingles in panel form were introduced in considerable number during the past year and have already gained considerable popularity. This larger unit of product allows utilization of narrower stock and reduces handling costs. Prefabricated home manufacturers are using preshingled walls because of their low cost and the ease with which walls are spliced and laced to form a smooth joint.

Dairy products manufactured in the 11 Western States—1953

From Department of Agriculture

	Creamery butter (1,000 lb.)	Cottage cheese (1,000 lb.)	Evaporated whole milk (1,000 lb.)	Ice cream (1,000 gal.)	Ice milk (1,000 gal.)
Montana	6,634	2,225	...	2,699	293
Idaho	24,818	2,601	...	2,447	674
Wyoming	2,553	961	...	726	126
Colorado	16,347	9,700	...	5,544	1,543
New Mexico	765	2,436	...	1,358	392
Arizona	...	3,307	...	2,446	973
Utah	5,682	8,008	60,994	2,844	860
Nevada	574	182	...	888	286
Mountain states	57,849	29,240	165,905	18,952	5,147
Washington	19,201	33,387	68,001	9,257	2,397
Oregon	15,728	12,733	...	6,116	1,606
California	28,482	152,430	289,826	45,722	14,964
Pacific Coast states	63,411	198,550	364,970	61,095	18,967

A section of the February 1955 issue of WESTERN INDUSTRY—609 Mission Street, San Francisco 5, Calif.

ARIZONA

NEW PLANT — Peth Manufacturing Co. of Phoenix is building new plant for production of precision instruments at 1137 W. Hilton.

FIRM MOVING—Vari-weld Co. is moving to new building at 2026 S. 11th Ave., Phoenix.

BUILD WAREHOUSE — Allied Steel Co., new firm which grew out of merger of Johnson-Foster Iron Works and Goltun and Gant, has under construction new warehouse and office in Phoenix.

CALIFORNIA

PESCO PACIFIC—New service center for testing, repair, and maintenance of component aircraft parts will be opened in North Hollywood by Pesco Products Division of Borg-Warner Corp., Chicago. Home plant of Pesco Products is Bedford, Ohio.

PIPE PROTECTION PLANT — New Hill, Hubbell & Co. plant at Denver is in full swing producing factory-wrapped and coated steel pipe for construction. Firm is a division of General Paint Corp., Cleveland, Ohio.

READY TO GO—Hubbard and Co., manufacturer of pole line hardware, completes $500,000 expansion and modernization program at its Emeryville plant, adding 40,000 sq. ft. of floor space for galvanizing operations and storage and assembly, and installing new machinery. Company also has added facilities at its Chicago and Pittsburgh, Pa., plants.

BUY MISSION PIPE—Republic Supply Co. of California acquires Mission Pipe and Supply Co., San Diego and Santa Ana distributor of wholesale industrial and plumbing supplies. Firm name and present management will continue.

TIDE WATER PLANS—Tide Water Associated Oil Co. will carry out a $127,000,000 nationwide development and expansion program in 1955, to include $60,000,000 expenditure for refinery building and modernization. Company's Watson, Calif., refinery is closed because it is obsolete, to be replaced temporarily by Avon Flying A refinery, where a new 10,000 bbl. per day platformer is to begin operation. Storage tanks at Watson will continue to be used.

SOLAR SELLS FOUNDRY — Newly formed Pacific Alloy Engineering Corp. purchases stainless alloy foundry operation of Solar Aircraft Co., and plans to move equipment to new 24,000-sq. ft. building in El Cajon during March. New company is a subsidiary of Pelton Steel Casting Co. of Milwaukee, and Solar owns a minority interest in new firm. Walter H. Dunn, who has been in charge of foundry under Solar administration, is vice president and general manager of new firm, which will produce industrial alloy castings in addition to aircraft work.

FIRST OF FOUR UNITS—Ground is broken for $4,000,000 structure to house Missile Systems Division of Lockheed Aircraft Corp. at Burbank, with explosion of buried charge of powder by electronic signal from Lockheed's missile test base near Alamogordo, N. M. This building, first of four units designed as part of company's $10,000,000 master plan for missile research, will be completed in fall.

FAIRCHILD PLANT—New Los Angeles plant for Fairchild Camera and Instrument Corp. of Syosset, N. Y., will house manufacturing facilities of Potentiometer Division and offices for other divisions of company. Floor space of 24,000 sq. ft. will be provided in first stage, by April 1955, with additional 24,000 sq. ft. to be added at later date. Company now has West Coast sales and service quarters at Pasadena.

MORE SPACE FOR FOX HILLS—Fox Hills Tool and Die, Culver City, moves to 6,700 sq. ft. building at 5747 Marilyn Ave., increasing production capacity by 30%. Company manufactures special machinery, aircraft and industrial tools and dies, and heat sealing and packaging machinery.

RADIOACTIVE — Stanford Research Institute's Radiation Engineering Laboratory obtains additional 2,000-curie source of radioactivity from Atomic Energy Commission laboratory at Brookhaven, to be used in experiments in cold sterilization of food and study of effects of radiation on materials and chemical reactions.

CO-OPERATING—Consolidated Engineering Corp., Pasadena, enters agreement with Phillips Petroleum Co., Bartlesville, Okla., by which it will manufacture and market continuous plant analysis and control instruments developed by Phillips.

NEW PRODUCT, NEW VENTURE—Poolmaster, Inc., is formed in Burlingame to manufacture newly developed swimming-pool cleaner, named Poolmaster Hydro-Jet vacuum cleaner.

KAISER PROJECTS—Kaiser Gypsum Co., Oakland, starts work on $3,000,000 expansion of its Long Beach plant, which will increase capacity by over 60%. Four new buildings are planned, as well as alterations to gypsum board production line, drying capacity, and calcining facilities. Existing plant will continue in full operation during renovation, and enlarged plant will be in full operation by late 1955.

Kaiser Steel Corp. will build $1,150,000 structural steel warehouse at its Fontana mill for stocking pipe and structural shapes.

Chemical Division of Kaiser Aluminum and Chemical Corp. will start work in April on $4,000,000 plant to produce basic refractories at Columbiana, Ohio. This is Kaiser Aluminum's third major plant addition in East since last fall.

MILITARY RELATIONS—Garrett Corp. of Los Angeles sets up new Military Relations and Foreign Operations Department, headed by W. J. Pattison, former director of sales and service.

MORE GLASS DOORS—Arcadia Metal Products, Arcadia, buys 10-acre site in Fullerton for proposed new manufacturing plant.

D-H speeds up the process!

"Welding" seams instead of sewing them, D-H equipment permits high-speed production of vinyl items at Gordon Holcombe Co., San Francisco, leading manufacturer of air mattresses, oxygen tents, raincoats, and similar products.

Dielectric heating is streamlining food processing, plywoods, plastics...*producing results impossible any other way*

An electronic method that speeds up processes requiring application of heat—that's D-H! Considered the cleanest and most compact method, D-H increases production, improves quality, reduces rejects and saves on labor costs—results impossible any other way. D-H can be applied only to non-metalic materials (normally poor conductors of electricity) such as plastics, wood, glass, adhesives, rubber, paper and foods. Research for new uses of D-H includes sterilization of canned meats, mold-free bread, setting glue in laminated airplane spars and plastic plywood for planes, boats and furniture.

Here's what D-H offers Compact installation • Consistent performance • Stable operation Simplified, accurate control • Increased output.

Here's what D-H is doing

...in food processing: Reduces vitamin losses, now makes it possible to produce mold-free bread.

...in plywood industry: Speeds up binding process by bringing wood and glue lines to right temperatures in 60 seconds.

...in plastic molding: Reduces curing time, eliminates breakage of inserts and pins, minimizes gassing problems.

...synthetic fabric products: By "welding" all seams instead of sewing them, D-H improves quality, saves space, time, labor.

Many new industries have grown *out* of dielectric heating, and many more will grow with it. If you'd like to know about its possibilities for your plant, call your local P. G. and E. office. D-H is another example of electricity put to work for you.

P·G and E·
Pacific Gas and Electric Company

NEW YORK SUBSIDIARY—Morehouse Industries of Los Angeles buys plant, machinery, and inventory of dissolver machinery manufacturing division of Cowles Co., Inc., Cayuga, N. Y. New company will have name of Cowles Dissolver Co., and will continue manufacture of machines for dissolving particles. Cowles Co., seller, will concentrate on developing paper-making machinery.

ADD TO GLENDALE PLANT—General Controls Co. begins construction on two additions to its Glendale plant for production of automatic temperature, pressure, and flow controls. Two-story 15,000 sq. ft. addition to engineering building will house tooling and engineering activities. Second story added to main office building will increase office space by one third.

TEAMWORK — Design team of 60 scientists and technicians from Northrop Aircraft, Inc., Hawthorne, and Radioplane Co. of Van Nuys, its subsidiary, moves into special facility at American Motors plant, El Segundo, to work on classified pilotless aircraft project.

GM CENTER OPENS—San Leandro training center is formally opened by General Motors Corp. This is the 17th in a national network of training centers set up for training dealer service personnel, mechanics from independent shops, and mechanics employed by owners of GM vehicle fleets. Thirteen other centers are scheduled to open this year.

PROGRESS REPORT—Hall-Scott Motor Co. of Berkeley, now separated from ACF-Brill Co., plans increased production of Model 590 industrial engine in 1955. New president is Laurance H. Cooper. J. D. Towne remains as vice president in charge of operations.

MODERN DESIGN — Germain's Inc., horticultural firm, opens 10-acre $1,000,000 plant and warehouse in central manufacturing district of Los Angeles. Plant features new system of moving loaded pallets by means of power driven rollers in the floor.

NEW RECORD—Production of air transports by Lockheed Aircraft Corp., Burbank, in 1954 reached value of $70,000,000. Total of 41 new transports were delivered to 12 commercial airlines, including foreign customers.

EXPANSION BUDGET—Southern California Edison Co. will spend about $76,000,000 for construction and plant expansion during 1955.

RICHFIELD RESEARCH—Richfield Oil Corp. begins construction of $2,500,000 research and development center at Anaheim, for expanded research on fuel and lubricants now housed at its Long Beach refinery laboratory. Project will consist of five main buildings and auxiliary facilities. H. K. Ferguson Co. of Los Angeles is contractor.

CONTRACTS FOR NORTHROP—Anaheim division of Northrop Aircraft, Inc., receives government contracts in excess of $3,750,000. Biggest is a $2,000,000 subcontract for production of ballistic computers awarded by General Motors Corp.'s Fisher body division.

BUY JORDAN ELECTRONIC—Jordan Electronic Manufacturing Co., Pasadena, is acquired as a wholly-owned subsidiary by Panellit, Inc., Chicago, manufacturer of automatic control and data reduction systems.

APPROVE SALE — California Public Utilities Commission approves sale of Pacific Freight Lines, Los Angeles, to Pacific Motor Trucking Co., subsidiary of Southern Pacific, in a $6,000,000 transaction.

STANDARD BUYS PLANT—Standard Oil Co. of California will buy El Segundo synthetic rubber plant which it operates for federal government.

MAX FACTOR BUILDING — Work starts on $1,000,000 office and laboratory building in Los Angeles for Max Factor Co. It will be completed by mid-October.

WATER HEATERS — General Water Heater Corp. will manufacture complete line of wall and forced-air furnaces in leased 12,000-sq. ft. plant in North Hollywood.

OPEN BRANCH—Minneapolis-Honeywell Regulator Co. opens 20,000-sq. ft facility in West Los Angeles which will be used as an engineering and development center for company's aeronautical division.

PG&E PLANT AT EUREKA—California Public Utilities Commission approves construction of steam electric generating plant near Eureka by Pacific Gas and Electric Co., to cost about $8,195,000. Plant will use oil for fuel.

SEED CLEANING PLANT—C. M. Volkman Co. is building $100,000 plant in Woodland, Yolo County, which will clean small seed for Northern California markets. Storage capacity will be about 6,000,000 lb.

LOS ANGELES PLANT—Braun Corp., industrial chemicals and equipment distributor, is building $800,000 plant in East Los Angeles, which will be completed in July.

BUY IN BELMONT—Beckman Instruments, Inc., Los Angeles, acquires Specialized Instruments Corp. and Spinco Service Co., both of Belmont. Spinco is repair and service firm for the scientific equipment manufactured by Specialized Instruments.

EXPAND STUDIOS — Gross-Krasne, Inc., producer of television shows, is expanding its California studios at a cost of about $1,000,000. Work will be completed by May.

PASADENA PLANT—Gilco Engineering and Manufacturing is building new 7,000-sq. ft. plant in Instrument Park Center at Pasadena, to cost $80,000. Company designs and manufactures pressure regulators, guidance systems, and gyro components.

WILL BUILD IN WEST — Kimberly-Clark Corp., Neenah, Wisc., plans to build 250,000-sq. ft. plant in Fullerton for production of paper products. Plant will be completed by January 1956 and will employ around 300.

BUY TOOL FIRM—U. S. Industries, Inc., of Chicago acquires Fray Machine Tool Co., Burbank, and will move operations into Vernon plant of its Axelson Manufacturing Co. division. Fray has manufactured milling machines, heads, and offset boring heads.

METTLER-ECLIPSE—Mettler Co., Inc., Los Angeles manufacturer of gas-fired burners, is sold to Eclipse Fuel Engineering Co., of Rockford, Ill., and will be operated as a division of that company under present name.

CARLISLE BUYS STONER — Stoner Rubber Co., Anaheim producer of vibration isolation products for aircraft and industrial tool parts, is sold to Carlisle Corp., Carlisle, Pa.

PLYWOOD COMPANY SOLD—Twin Harbors Lumber Co., Aberdeen, Wash., acquires entire interests of Durable Plywood Co., Calpella.

POGO-STICK CONTRACT — Ryan Aeronautical Co., San Diego, receives Air Force contract for development of a jet-powered vertical take-off aircraft.

COLORADO

NEW FIELD FOR CF&I—Colorado Fuel and Iron Corp. will market new by-product of coke production at its Pueblo steel mill, diammonium phosphate fertilizer, under trade name "DAP." Production of diammonium phosphate was made possible by changes in methods and facilities at Pueblo, resulting from studies made in collaboration with Monsanto Chemical Co. and Koppers Co., Inc.

SUNDSTRAND PICKS DENVER—Sundstrand Machine Tool Co., Rockford, Ill., will build $5,000,000 plant in Denver for production of electrical aircraft systems, to employ 800 to 1,000 workers in full swing. Design work is underway on 150,000-sq. ft. first unit of planned 300,000-sq. ft. plant. Completion of all buildings is set for early 1956, but production will begin in October with over 400 employees.

BUY HATHAWAY—Hamilton Watch Co. of Lancaster, Pa., acquires Hathaway Instrument Co., Denver manufacturer of electronic instruments, in exchange of stock.

WAREHOUSE BURNS — Estimated $500,000 loss results from fire which destroys warehouse of Weld County Certified Seed Potato Growers Cooperative at Lucerne.

IDAHO

POTLATCH PLANT—Construction of new pulp and paper mill for Potlatch Forests, Inc., gets under way at Lewiston. J. A. Park Co. of Bellevue, Wash., is general contractor. Output of new mill will be 200 tons a day, bringing total production of paper products for Potlatch at Lewiston to 525 tons daily.

NEVADA

CONTRACT FOR GAS—Nevada Natural Gas Pipe Line Co. contracts to supply 11,700,000 cu. ft. per day of natural gas for fuel to Southern Nevada Power Co. for electric generating plant near Whitney which will be in operation by next December. Original $6,500,000 plant, producing 44,000 kw., will be enlarged by June 1957 to increase capacity by another 60,000 kw., at a cost of a further $7,000,000. Pipeline company plans to construct parallel line between Las Vegas and Needles, Calif., before 1957 in $2,500,000 project.

NEW MEXICO

NUCLEAR RESEARCH—Armed Forces Special Weapons Project, Albuquerque, awards one-year contract for classified research to Nuclear Development Associates, Inc., private nuclear engineering firm in White Plains, N. Y.

REOPENS MINES—Western Development Co., Santa Fe firm headed by William E. Scorah, will reopen abandoned Cerrillos mining district by early summer and build mill for processing lead and zinc ore. Firm also has mining and prospecting rights on 17,000 acres south of Cerrillos district.

POTASH VENTURE—National Farmers Union, Denver, signs agreement with Kerr-McGee Oil Industries of Oklahoma City forming a company to develop NFU potash holdings in New Mexico. Stock in company will reportedly be divided evenly between two backing groups. James G. Patton, president of NFU, will head company, and Sen. Robert Kerr (D., Okla.) will be chairman of board.

REVITALIZED—Raton Packing Co., Raton, reorganizes and will resume full-scale operations. President of new organization is John S. Sheritt, Fort Collins, Colo.

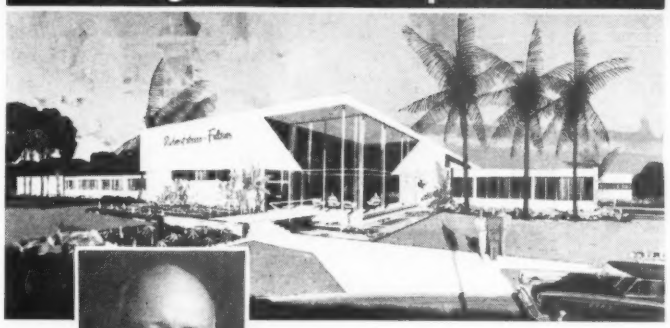
OREGON

BUILDING PLANT—Premier Manufacturing Co., and its subsidiary, Modern Pattern Works, are building $70,000 plant in Portland for expanded manufacture of freight trailer couplings and wood patterns for castings.

BUY PACKING FIRM—Columbia Pickling and Packing Co., Portland, is purchased by Nalleys, Inc., Tacoma, Wash., at reported cost of nearly $1,000,000. Purchase does not include buildings or land holdings. Pickle products will continue to be marketed under Columbia brand, and new firm name will be Columbia Packing Corp.

FASHIONCRAFT EXPANDS — New $51,000 plant and warehouse will be built in Portland by Fashioncraft Furniture Co. for increased production of upholstered furniture.

Looking for a new plant site?



ROBERTSHAW-FULTON CONTROLS CO.

Great quantities of the many fine Robertshaw-Fulton Controls for home and industry flow from the new Long Beach plant, opened in February, 1955.

"With the demand for Grayson controls greater than ever, additional production area and facilities were absolutely needed. We needed off-street parking for approximately 1,000 employees, and we wanted ample room for further plant expansion. We considered it highly important to be located in, and identified with, a healthy, growing industrial community.

"We chose a site in Long Beach because it offered these advantages, and more. Here we are well located in relation to a great many of our customers and suppliers. We will continue to have adequate utility services and complete shipping facilities. A network of fast highways is at our doorstep. We believe we found an ideal location."

T. J. Arden, *Exec. Vice President*
ROBERTSHAW-FULTON CONTROLS COMPANY

Locate Your Plant in
LONG BEACH
IN SOUTHERN CALIFORNIA

PROFIT-MAKING CLIMATE

Long Beach's year-round equable climate, air-conditioned by nature, is of major industrial importance.

Worker energy, endurance and job interest are appreciably higher. Mechanical air-conditioning is unnecessary except to control critical processing. A minimum of heating is necessary, only for a few hours in some of the winter days.

Rain is concentrated in the winter months, with dry summers and falls. There is no snow and practically no freezing temperatures. Summer days are kept cool and fresh by ocean breezes.

Substantial construction savings, coupled with reasonably low-cost land, are definite profit factors. The mild climate permits efficient one-floor plant layout, designed for ideal production-line methods. Plants in this area cost less to build, operate and maintain.

FREE BROCHURES: *Write for free literature describing the many industrial advantages of the Long Beach area.*

CHAMBER OF COMMERCE • DEPARTMENT OF INDUSTRY
200 East Ocean Boulevard, Long Beach 2, California

CHANGE IN OWNERS—Ben Dierks Lumber Co., Inc., of Murphy is purchased by new corporation, Conifer Wood Products Co., Inc., backed by Joe M. Crahane of Independence, and associates.

MANUFACTURE RAFTERS—Astoria Manufacturing Co. starts production of laminated trusses and rafters in leased portion of Astoria Marine Construction Co. plant, Astoria. Company plans to build new plant later this year. D. W. Eccles is general manager of new concern.

NEW WOOD FIRM—Coats, Huddleston-Buck Lumber Corp. is organized in Portland and buys Blake-David plant for remanufacturing and wholesaling operations. Product will be structural room-decking material, and plant will perform resaw, planing, kiln drying, and milling.

SAWMILL AT TOLEDO—Dundee Piling Co. builds new mill at Toledo with capacity of nearly 110,000 bd. ft., to be in operation this month. Company plans to add piling plant by spring, as well as a creosote plant and alder mill.

PLANING MILL—New planing mill will be built on site purchased from city of Madras by Philip Dahl, of Dahl Pine, Inc., and Harold Barclay, owner of Barclay Logging Co., Sisters. Mill will be in operation by March, employing about 30 men.

TITANIUM RESEARCH — Bureau of Mines facilities at Albany, Ore., and Boulder City, Nev., will begin research and development program on production of titanium tetrachloride from domestic ores, according to recent joint announcement from Office of Defense Mobilization and Department of Interior.

CHAIN WAREHOUSE — Campbell Chain Co., Portland, is building $100,000 warehouse to increase its facilities for handling automotive tire and industrial chains in Pacific Northwest.

NEW PLYWOOD MILL—Hub City Plywood Corp., new Albany firm, is building plywood mill with initial capacity of 3,000,000 bd. ft. per month, buying green veneer on open market.

BUY PLANT SITE—Terminal Ice and Cold Storage Co., Portland, bids for Milwaukie industrial site offered by Oregon Liquor Control Commission. Company is purchasing land for future construction of new plant and headquarters.

HINES PURCHASE — Edward Hines Lumber Co. buys capital stock of Oregon Lumber Co., Baker, which includes new hardboard plant and sawmill at Dee, pine sawmill at Bates, and millwork fabricating plant at Baker. Price was reported to be over $5,000,000.

CHIPS FOR ST. HELENS—Pope and Talbot installs log barker at its St. Helens mill, first step in planned chipping plant which will supply St. Helens Pulp and Paper mill. Chips will be transported to paper mill through a tube, blown by air pressure.

FIR-PLY MILL—New firm is organized by former officials of Southern Oregon Plywood Co. at Grants Pass, under name of Fir-Ply, Inc., which will build mill to produce rough plywood at Medford. Construction of mill will start early in year, costing around $550,000. Plans call for three-shift operation employing over 100 men.

UTAH

VITRO MINERALS — Jointly - owned subsidiary, Vitro Minerals Corp., is formed by Vitro Corp. of America and Rochester and Pittsburgh Coal Co., to carry out exploration, drilling, and mining of uranium claims held by two companies. Open-pit mining near Riverton, Wyo., will begin this month. Other claims to be worked are in Utah and Ontario, Canada. Jack O. Horton, former manager of ore department of Vitro Uranium Co. of Salt Lake City, is named general manager of new company.

SELL SALT WORKS — Deseret Livestock Co. sells its plant producing industrial salt located on Great Salt Lake to new independent firm, Deseret Salt Co. Purchase includes 300 acres of salt ponds and 1,500 acres of fee lands.

CONSTRUCTION PLANS—Utah Power and Light Co. will spend $18,000,000 on new construction in 1955, to include completion of third unit of its Gadsby steam electric plant at Salt Lake City; additions to its Carbon County plant; new office building at Ogden; and transmission line, substation, and distribution facilities for Western Colorado Power Co., a subsidiary.

WASHINGTON

CEMENT AMALGAMATION — Ideal Cement Co. of Denver, and Superior Portland Cement Inc., Spokane, have announced a merger through exchange of stock. Annual sales of the two companies, merged under the Ideal firm name, would exceed $60,000,000.

LONGVIEW PORT BUYS WAREHOUSE — Port of Longview commissioners take steps to purchase a 20 x 240 ft. concrete warehouse and 32 acres of land a half mile east of the port docks. Property will cost $175,000. Also authorized is expenditure of $25,000-$30,000 for construction of four bulk oil or tallow storage tanks.

RICHLAND BUSINESS FOR 1954—Purchase orders and supply contracts totaling 60,850 with a value of $61,658,000 were placed during 1954 at Hanford Works. Washington firms received $31,000,000; Oregon got $10,500,000; and $120,000 went to Idaho concerns.

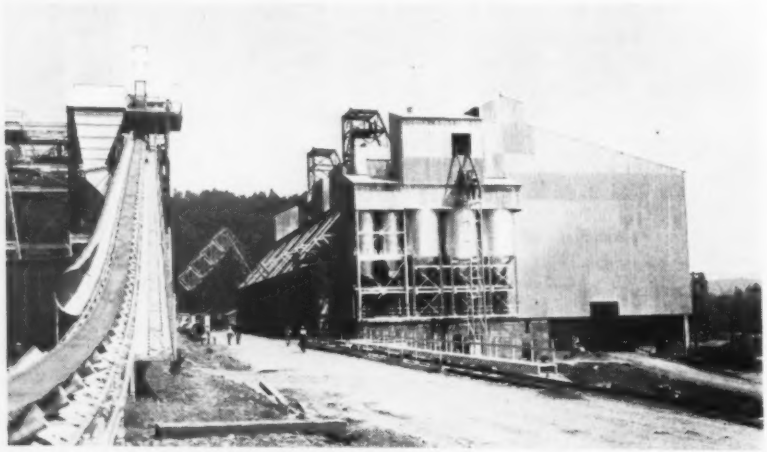
STATE - BUILT STEAM PLANTS — Washington State Power Commission indicates it will soon begin steps to provide some of the 1,200,000 kw. of steam-generated power needed in the state in the next decade. No time has been set for construction to begin.

COLUMBIA ELECTRIC TO BUILD—Wholesale division of Columbia Electric & Manufacturing Co. is building a $300,000 warehouse and office building of 62,600 sq. ft. of floor space in Spokane. Completion is scheduled for June.

INCREASED REFINERY CAPACITY—General Petroleum Co. plans to expand its Ferndale refinery by several million dollars. Present capacity is to be increased by several thousand barrels per day within the next five years. Added production will be for high quality gasolines, diesel oils, and middle distillate fluids.

DEBARKER INSTALLATION—Installation of a log debarker is underway at the Long Lake Lumber Co., Spokane. The machine, manufactured by Nicholson Manufacturing Co., is designed to handle logs to 40-in. in diameter and is expected to increase lumber yield besides making the mill operations safer.

RAILROAD MERGER—Willamina and Grand Ronde Railroad Co. has merged into the Longview, Portland & Great Northern Railway Co. Both companies are subsidiaries of Long-Bell Lumber Co., Longview.



FIRST OF ITS KIND—Nickel smelter being built for M. A. Hanna Co. at Riddle, Ore., is first in United States for production of ferro-nickel.

CANADIAN PIPELINE STRETCH — Trans-Mountain pipeline carrying Alberta crude to the Pacific Coast, will be extended another 36 mi. within Washington. Contract for the job, expected to cost $2,750,000, is awarded to Engineers Limited Pipeline Co.

McCLEARY MODERNIZATION — McCleary plywood and door branch of Simpson Logging Co. begins construction of a new veneer drier. The $150,000 project will be housed in a 40 x 175 ft. building. In addition, the door plant's cutting department is to be modernized.

PILOT PRESERVATIVE PLANT — Reichhold Chemicals, Inc., has entered the wood preservatives field with establishment of a Seattle pilot plant for production of pentachlorophenol by a new process. A full-sized production unit is under construction.

COLUMBIA BASIN MILK—A corporation formed at Moses Lake for canning whole fresh milk under a new process, has begun sale of bonds. The new firm, Winger Dairy Foods, Inc., has a capacity of 10,000 quarts daily, and expects to reach world-wide markets.

BARK HAS NEW BITE—Rayonier, Inc., introduces new product made from waste hemlock bark for use in oil well drilling. An additive which serves as a thinner for mud used in drilling tools, "Rayflo" will be produced commercially at Rayonier's Hoquiam plant. Company's research division at Shelton developed new product.

PLAN EXPANSION — Ted Millgard Farm Chemicals, Walla Walla fertilizer distributing firm, is purchased by Jack Huntington of Walla Walla and C. L. Cummings of Pendleton. New owners plan to expand storage facilities at plant through use of 1,000-gal. tanks and to extend operations to Prescott and Waitsburg.

BIRDS EYE TO BUILD—New building for storage of packaging material will be added to Birds Eye plant in Walla Walla at cost of about $60,000.

WEISER GROWS—A new dry kiln and planing mill will be added at a cost of $250,000 to Weiser Lumber Co. at Marysville. Company is considering also adding a second sawmill.

PLANT AT DISHMAN—Plant is under construction at Dishman for Northwest Refining and Chemical Co., which plans to employ 14 men in converting zinc ores to zinc oxide for paint pigment and rubber manufacturing. By-product will be ammonium sulfate, used as fertilizer.

NEW AREA FOR NATURAL GAS—Pacific Northwest Pipeline Corp. plans to build lines serving Columbia Basin, Coeur d'Alene and Metaline mining districts, and Lewiston area.

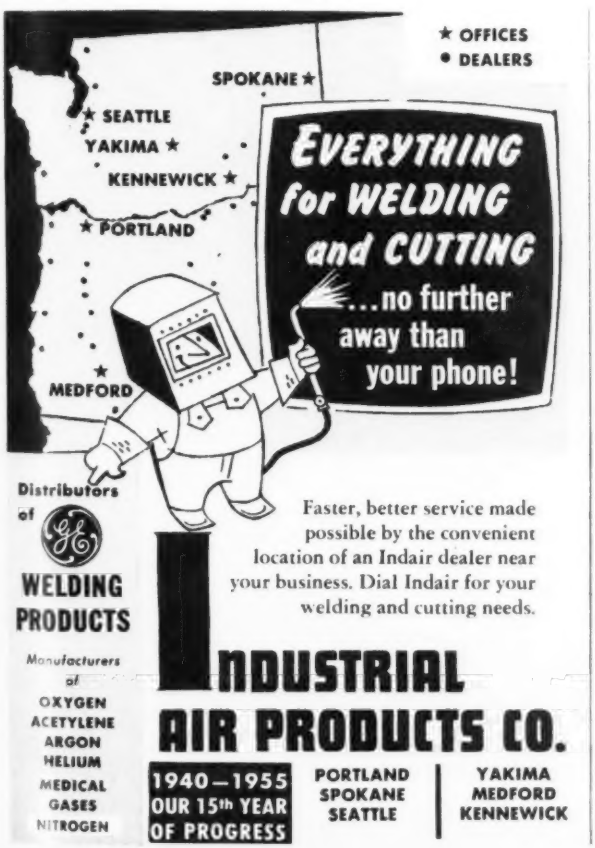
WYOMING

CLARETON GAS PLANT — Black Thunder Oil Co., Inc., of Rapid City, S. D., is to build a $400,000 natural gas plant in the Clareton oil field in Weston County. Construction is to begin within two months on the plant designed to process 5,000,000 cu. ft. per day of natural gas, extracting butane, propane, and gasoline for commercial sale.

URANIUM ORE STATION—A uranium ore-buying station at Riverton is scheduled to open early in 1955. Station is being built by the Walker-Lybarger Construction Co. at a cost of $135,000. It will be operated by American Smelting & Refining Co. for the AEC.

EXPANDING FRONTIER — Frontier Refining Co. will begin building new facilities at its Cheyenne refinery by March 1, to be completed in summer. Expansion will include new platformer and unifier, additional storage facilities of 100,000 bbl., and new steam plant. Estimated cost of program, $1,500,000.

ICING PROJECT — Pacific Fruit Express undertakes $465,000 project to mechanize its refrigerator car icing platform at Laramie. Capacity will be increased to 200 cars and three icing machines installed. Pacific Fruit Express is jointly owned by Union Pacific and Southern Pacific railroads.



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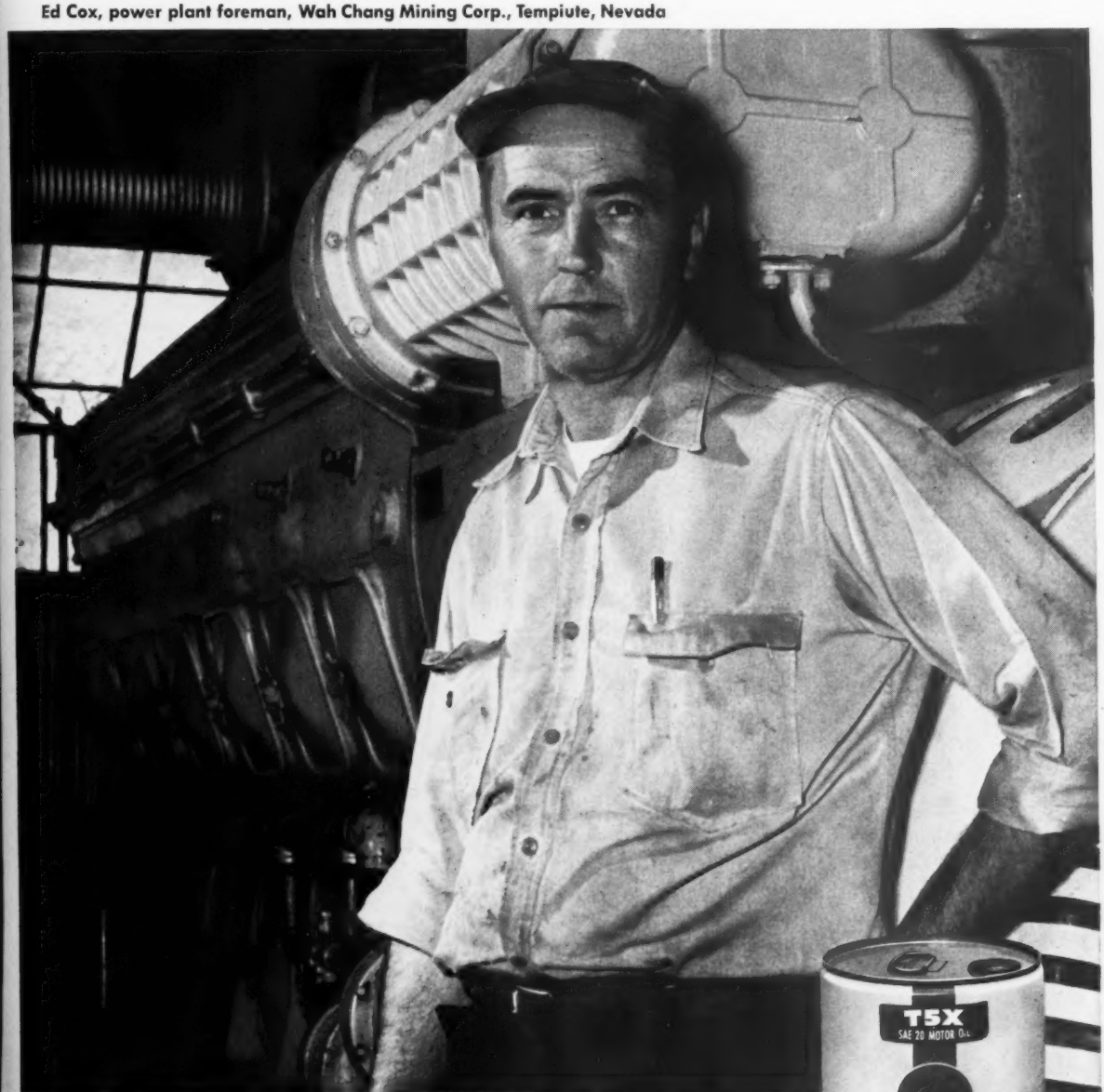

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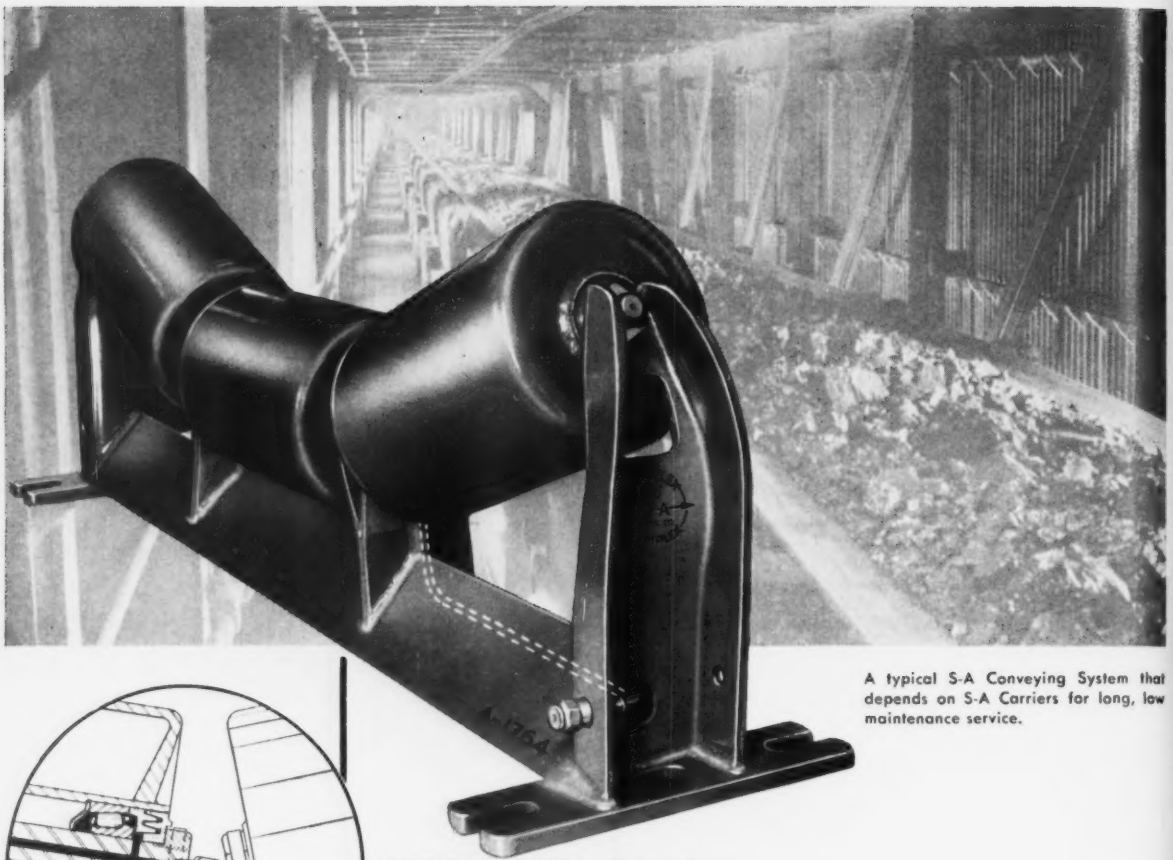

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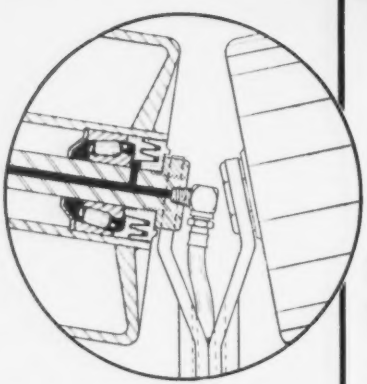

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